AGRICULTURAL RESEARCH INSTITUTE
PUSA

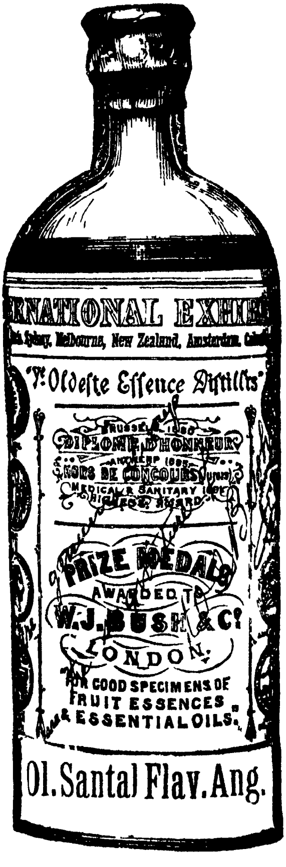
IT IS IMPERATIVE . . .

THAT CHEMISTS AND OTHERS REQUIRING

Essential Oils

FOR MEDICINAL PURPOSES SHOULD EMPLOY GENUINE OILS OF THE FINEST QUALITY **ONLY.**

These can be obtained from W. J. Bush & Co., Ltd., who guarantee the following to be absolutely pure, and to pass the characters and tests of the British Pharmacopœia, 1898.



OL. AMYGDALÆ ANG.
OL. ANETHI ANG.
OL. ANISI.
OL. ANTHEMID. ANG.
OL. CADINUM.
OL. CAJUPUTI.
OL. CARUI ANG.
OL. CARYOPH. ANG.
OL. CINNAMOMI. VER. ANG.
OL. COPAIBÆ ANG.
OL. CORIANDRI ANG.
OL. CUBEBÆ ANG.

OL. EUCALYPTI.
OL. JUNIPERI ANG.
OL. LAVANDULÆ.
OL. LIMONIS.
OL. MENTHÆ PIP. ANG.
OL MENTHÆ VIRIDIS ANG.
OL. MYRISTICÆ ANG.
OL. OLIVÆ.
OL. PIMENTÆ ANG.
OL. ROSÆ.
OL. ROSMARINI.
OL. SANTALI FLAV. ANG.

W. J. BUSH & CO., LTD.,
Head Offices: ASH GROVE, HACKNEY, LONDON N.E.

HEARON'S

HEARON, SQUIRE & FRANCIS,

Limited,

Established 200 Years.

Wholesale & Export Druggists,

Analytical and Manufacturing Chemists.

. . MAKERS OF . .

COMPRESSED TABLETS, . .

GELATINE CAPSULES,

. . . AND PERLES.

Medicated Bougies, Pessaries, and Suppositories.

Hypodermic Tablets, Granular Effervescing Preparations.

GELATINE COATED PILLS, round or oval.

Samples, Quotations and Price Lists, from

38 & 40, Southwark Street,
London, S.E.

Yours truly,
W. A. H. Naylor

YEAR-BOOK OF PHARMACY

COMPRISING

ABSTRACTS OF PAPERS

RELATING TO

PHARMACY, MATERIA MEDICA, AND CHEMISTRY

CONTRIBUTED TO BRITISH AND FOREIGN JOURNALS

FROM JULY 1, 1904, TO JUNE 30, 1905,

WITH THE

TRANSACTIONS

OF THE

BRITISH PHARMACEUTICAL CONFERENCE

AT THE

FORTY-SECOND ANNUAL MEETING

HELD IN

BRIGHTON,

JULY, 1905

Editor of the Year-Book,
J. O. BRAITHWAITE

Editors of the Transactions,
E. SAVILLE PECK, M.A
EDMUND WHITE, B.Sc., F I C

LONDON
J & A CHURCHILL, 7, GREAT MARLBOROUGH STREET,
1905.

BUTLER & TANNER,
THE SELWOOD PRINTING WORKS,
FROME, AND LONDON

BRITISH PHARMACEUTICAL CONFERENCE.

OFFICERS FOR 1905-1906.

President.

W. A. H. NAYLOR, F.I.C., F.C.S., London.

Vice-Presidents,

Who have filled the office of President.

JOHN ATTFIELD, Ph.D., F.R.S., F.I.C., F.C.S., Watford.
S. R. ATKINS, J.P., Salisbury.
CHAS. UMNEY, F.I.C., F.C.S., London.
OCTAVIUS CORDER, Norwich.
N. H. MARTIN, F.R.S.E., F.L.S., Newcastle-on-Tyne.
C. SYMES, Ph.D., Ph.C., F.C.S., Liverpool.
J. C. C. PAYNE, J.P., M.P.S.I., Belfast.
E. M. HOLMES, F.L.S., Ph.C., London.
G. C. DRUCE, M.A., F.L.S., Oxford.
T. H. W. IDRIS, L.C.C., F.C.S., London.

Vice-Presidents.

R. A. ROBINSON, L.C.C., J.P., London.
D. B. DOTT, F.R.S.E., F.I.C., Edinburgh.
W. F. WELLS, Dublin.
THOS. BARCLAY, Birmingham.
F. RANSOM, F.C.S., Hitchin.
HENRY G. GREENISH, F.I.C., F.L.S., London.

Honorary Treasurer.

J. C. UMNEY, F.C.S., London.

Honorary General Secretaries.

E. SAVILLE PECK, M.A., Cambridge.
EDMUND WHITE, B.Sc., F.I.C., London.

Honorary Local Secretary.

CHAS. THOMPSON, Birmingham.

Other Members of the Executive Committee.

F. H. ALCOCK, Birmingham.
F. C. J. BIRD, London.
H. W. GADD, Exeter.
A. W. GERRARD, Birmingham.
D. LLOYD HOWARD, London.
W. H. MARTINDALE, London.
W. W. SAVAGE, Brighton.
J. F. TOCHER, Peterhead.
R. WRIGHT, Buxton.

These Officers collectively constitute the Executive Committee. Three retire annually, being eligible for re-election.

Assistant Secretary.

JOHN HEARN, London.

Auditors.

J. W. BOWEN, London, and W. P. ROBINSON, London.

Honorary Colonial Secretaries.

For Bengal	W. T. GRICE, F.C.S., Calcutta.
„ Bombay	J. STANLEY SMITH, Bombay.
„ Canada	J. BEMROSE, F.C.S., Montreal.
„ Cape Colony and Natal . .	A. WALSH, Port Elizabeth.
„ Madras	W. E. SMITH, Madras.
„ New Zealand.	R. WILKINSON, Dunedin.
„ Queensland	STILES W. G. RICH, Brisbane.
„ Tasmania	A. P. MILLER, Hobart.
„ Victoria	H. SHILLINGLAW, Melbourne.
„ West Indies	A. JAMES TAITT, Port of Spain.

BRITISH PHARMACEUTICAL CONFERENCE

INAUGURAL MEETING HELD AT NEWCASTLE-ON-TYNE IN 1863.

Years.	*Places of Meeting.*	*Presidents.*	*Vice-Presidents.*	*Local Secretaries*
1864	Bath . . .	Henry Deane, F.L.S.	Prof. Bentley. F.L.S. Dr. Edwards, F.C.S. R. W. Giles, F.C.S. Prof. Redwood, F.C.S.	J. C. Pooley
1865	Birmingham	Henry Deane, F.L.S.	Prof. Bentley, F.L.S. Dr. Edwards, F.C.S. W. Southall. J. P. Tylee.	W. Southall, Jun.
1866	Nottingham	Prof. Bentley, F.L.S.	Dr. Edwards, F.C.S. D. Hanbury, F.R.S. Samuel Parr. W. W. Stoddart, F.G.S.	J. H. Atherton, F.C.S.
1867	Dundee . .	Prof. Bentley, F.L.S.	D. Hanbury, F.R.S. J. Ince, F.L.S. D. Russell. W. W. Stoddart, F.G.S.	J. Hodge.
1868	Norwich .	Daniel Hanbury, F.R.S.	R. Fitch, F.G.S. J. Ince, F.L.S. W. W. Stoddart, F G.S. J. R. Young.	F. Sutton, F.C.S
1869	Exeter . .	Daniel Hanbury, F.R.S.	G. Cooper. H. S. Evans, F.C.S. J. Ince, F.L.S. W. W. Stoddart, F.G.S.	M. Husband.
1870	Liverpool .	W. W. Stoddart, F.C.S.	J. Abraham. H. C. Baildon. H. S. Evans, F.C.S. J. Ince, F.L.S.	E. Davies, F.C.S. J. Dutton (Birkenhead).
1871	Edinburgh .	W. W. Stoddart, F.C.S.	J. Abraham. H. C. Baildon. J. Ince, F.L.S. J. Williams, F.C.S.	J. Mackay, F.C.S
1872	Brighton .	H. B. Brady, F.R.S.	J Ince, F.L.S. R. Reynolds, F.C.S. W. D. Savage. J. Williams, F.C.S.	T. Glaisyer.
1873	Bradford .	H. B. Brady, F.R.S.	T. H. Hills, F.C.S. R. Reynolds, F.C.S. F. M. Rimmington, F.C.S. J. Williams, F.C.S.	R. Parkinson, Ph.D.
1874	London . .	Thos. B. Groves, F.C.S.	T. H. Hills, F.C.S. R. Reynolds, F.C.S. Chas. H. Savory. J. Williams, F.C.S.	M. Carteighe, F.C.S.
1875	Bristol . .	Thos. B. Groves, F.C.S.	T. H. Hills, F.C.S. R. Reynolds, F.C.S. Chas. Boorne. Peter Squire, F.L.S.	J. Pitman.
1876	Glasgow .	Prof. Redwood, F.C.S.	T. H. Hills, F.C.S. R. Reynolds, F.C.S. E. C. C. Stanford, F.C.S. D. Frazer.	A. Kinninmont.
1877	Plymouth .	Prof. Redwood, F.C.S.	T. H. Hills, F.C.S. R. Reynolds, F.C.S. A. P. Balkwill. J. Williams, F.C.S	R. J. Clark.
1878	Dublin . .	G. F. Schacht, F.C.S.	Prof. Tichborne, F.C.S. R. Reynolds, F.C.S. R. W. Pring, L.A.H.D J. Williams, F.C.S.	W. Hayes.
1879	Sheffield .	G. F. Schacht, F.C.S.	Prof. Tichborne. F.C.S. R. Reynolds, F.C.S. W. Ward, F.C.S. J. Williams, F.C.S.	H. Maleham.
1880	Swansea .	W. Southall, F.L.S.	R. Reynolds, F.C.S. G. W. Sandford. W. Ward, F.C.S. N. M. Grose.	J. Hughes.
1881	York . .	R. Reynolds, F.C.S.	Prof. Attfield, F.R.S. R. Davison. N. M. Grose. C. Umney, F.C.S.	J. Sowray.

BRITISH PHARMACEUTICAL CONFERENCE

Years.	*Places of Meeting.*	*Presidents.*	*Vice-Presidents.*	*Local Secretaries.*
1882	Southampton	Prof. Attfield, F.R.S.	R. Chipperfield. T. Greenish, F.C.S. Prof. Tichborne, LL.D. J. R. Young.	O. R. Dawson.
1883	Southport	Prof. Attfield, F.R.S.	M. Carteighe, F.C.S. W. V. Radley. C. Umney, F.C.S. J. R. Young.	Wm. Ashton.
1884	Hastings	J. Williams, F.C.S.	S. R. Atkins. J. Bell. M. Carteighe, F.C.S. J. R. Young.	F. Rossiter.
1885	Aberdeen	J. B. Stephenson.	F. B. Benger, F.C.S. M. Carteighe, F.C.S. C. Ekin, F.C.S. J. P. Kay.	A. Strachan.
1886	Birmingham	T. Greenish, F.C.S.	T. Barclay. F. B. Benger, F.C.S. M. Carteighe, F.C.S. C. Ekin, F.C.S.	Chas. Thompson.
1887	Manchester	S. R. Atkins, J.P.	M. Carteighe, F.C.S. S. Plowman, F.R.C.S. C. Symes, Ph.D. G. S. Woolley.	F. B. Benger, F.C.S.
1888	Bath	F. B. Benger, F.C.S.	M. Carteighe, F.C.S. S. Plowman, F.R.C.S. C. Symes, Ph.D. W. Martindale, F.C.S.	H. Hutton.
1889	Newcastle-on-Tyne	C. Umney, F.I.C., F.C.S.	M. Carteighe, F.C.S. S. Plowman, F.R.C.S. C. Symes, Ph.D. N. H. Martin, F.L.S.	T. M. Clague.
1890	Leeds	C. Umney, F.I.C., F.C.S.	M. Carteighe, F.C.S. S. Plowman, F.R.C.S. A. Kinninmont, F.C.S. W. Smeeton.	F. W. Branson, F.C.S.
1891	Cardiff	W. Martindale, F.C.S.	M. Carteighe, F.C.S. A. Kinninmont, F.C.S. J. C. Thresh, M.B., D.Sc. J. Munday.	Alfred Coleman.
1892	Edinburgh	E. C. C. Stanford, F.C.S.	M. Carteighe, F.C.S. W. Gilmour, F.R.S.E. J. C. Thresh, M.B., D.Sc. J. R. Young, J.P.	Peter Boa.
1893	Nottingham	Octavius Corder.	M. Carteighe, F.C.S. J. Laidlaw Ewing. W. Hayes. R. Fitz Hugh.	C. A. Bolton.
1894	Oxford	N. H. Martin, F.L.S., F.R.M.S.	M. Carteighe, F.C.S. R. H. Davies, F.C.S W. Hayes. G. T. Prior.	H. Mathews.
1895	Bournemouth	N. H. Martin, F.L.S., F.R.M.S.	M. Carteighe, F.C.S. J. Laidlaw Ewing. W. Hayes. J. A. Toone.	Stewart Hardwick.
1896	Liverpool	W. Martindale, F.C.S.	M. Carteighe, F.C.S. J. Laidlaw Ewing. M. Conroy, F.C.S. W. Hayes.	T. H. Wardleworth. H. O. Dutton (Birkenhead).
1897	Glasgow	Dr. C. Symes, Ph.C.	Walter Hills. J. Laidlaw Ewing. W. F. Wells. R. McAdam.	J. A. Russell.
1898	Belfast	Dr. C. Symes, Ph.C.	Walter Hills. J. Laidlaw Ewing. J. C. C. Payne, J.P. W. F. Wells.	R. W. McKnight W. J. Rankin.
1899	Plymouth	J. C. C. Payne, J.P., Ph.C.	Walter Hills, F.C.S. R. J. Downes. John Moss, F.I.C., F.C.S. C. J. Park.	J. Davy Turney.

BRITISH PHARMACEUTICAL CONFERENCE

Years.	*Places of Meeting.*	*Presidents.*	*Vice-Presidents.*	*Local Secretaries.*
1900	London .	E. M. Holmes, F.L.S. Ph.C.	R. J. Downes, Ph.C. Walter Hills, F.C.S. John Moss, F.I.C., F.C.S. J. F. Harrington, Ph.C.	W. Warren. Herbert Cracknell.
1901	Dublin . .	G. C. Druce, M.A., F.L.S.	G. T. W. Newsholme, F.C.S. G. D. Beggs, M.P.S.I. Peter Boa, F.C.S. Prof. Tichborne, Ph.D.	J. I. Bernard.
1902	Dundee .	G. C. Druce, M.A., F.L.S.	G. T. W. Newsholme, F.C.S. G. D. Beggs, M.P.S.I. Chas. Kerr. W. A. H. Naylor, F.I.C., F.C.S.	W. Cummings.
1903	Bristol . .	T. H. W. Idris, F.C.S.	G. T. W. Newsholme, F.C.S. G. D. Beggs, M.P.S.I. Peter Boa. W. A. H. Naylor, F.I.C., F.C.S. J. W. White.	H. E. Boorne
1904	Sheffield .	T. H. W. Idris, F.C.S.	G. D. Beggs, M.P.S.I. D. B. Dott, F.R.S.E., F.I.C. W. A. H. Naylor, F.I.C., F.C.S. G. T. W. Newsholme, F.C.S. F. Ransom, F.C.S.	H. Antcliffe.
1905	Brighton .	W. A. H. Naylor, F.I.C., F.C.S.	R. A. Robinson. D. B. Dott. J. Montgomery. W. H. Gibson. F. Ransom. H. G. Greenish.	W. W. Savage. C. G. Yates.
1906	Birmingham	W. A. H. Naylor, F.I.C., F.C.S.	R. A. Robinson. D. B. Dott. W. F. Wells. F. Ransom. H. G. Greenish. T. Barclay.	C. Thompson.

Treasurers (One).

1863 to 1870, H. B. Brady, F.R.S.
1870 to 1877, George F. Schacht, F.C.S.
1877 to 1884, C. Ekin, F.C.S.
1884 to 1888, C. Umney, F.I.C., F.C.S.
1888 to 1890, W. Martindale, F.C.S.
1890 to 1893, R. H. Davies, F.I.C., F.C.S.
1893 to 1898, John Moss, F.I.C., F.C.S.
1898 to 1906, John C. Umney, Ph.C., F.C.S.

Honorary General Secretaries (Two).

1863 to 1880, Prof. Attfield, Ph.D., F.R.S.
1863 to 1871, Richard Reynolds, F.C.S.
1871 to 1884, F. Baden Benger, F.C.S.
1880 to 1882, M. Carteighe, F.C.S.
1882 to 1886, Sidney Plowman, F.R.C.S.
1884 to 1890, John C. Thresh, M.B., D.Sc.
1886 to 1901, W. A. H. Naylor, F.I.C., F.C.S.
1890 to 1903, F. Ransom, F.C.S.
1901 to 1906, E. Saville Peck, M.A.
1903 to 1906, Edmund White, B.Sc., F.I.C.

LOCAL CORRESPONDING SECRETARIES.

District.	*Name.*
Aberdeen	W. GILES.
Bacup	W. J. SUTCLIFFE.
Barnet	R. F. YOUNG.
Belfast	W. J. RANKIN.
Birmingham	C. THOMPSON.
Blackburn	R. LORD GIFFORD.
Bournemouth	STEWART HARDWICK.
Bradford	J. JACKSON.
Bridge of Allan	J. BAIN.
Brighton and Hove	R. A. CRIPPS.
Bristol	H. E. BOORNE.
Burton-on-Trent	G. WRIGHT.
Buxton	R. WRIGHT.
Cambridge	E. SAVILLE PECK.
Cardiff	J. MUNDAY.
Carlisle	J. HALLAWAY.
Cheltenham	F. J. PALMER.
Chester and Wrexham	H. F. J. SHEPHEARD.
Chislehurst	J. G. PREBBLE.
Cork	T. R. LESTER.
Coventry	H. W. JONES.
Derby	S. TAYLOR.
Doncaster	M. H. STILES.
Dublin	W. F. WELLS.
Dundee	WM. CUMMINGS.
Dursley	H. R. CHENEY.
Eastbourne	S. GIBBS.
Edinburgh	PETER BOA.
Exeter	H. WIPPELL GADD.
Glasgow	W. L. CURRIE.
Godalming	J. H. MATHER.
Harrogate	J. H. WILSON.
Hastings and St. Leonards	F. ROSSITER.
Hertford	G. R. DURRANT.
Hitchin	F. RANSOM.
Ilkley	G. W. WORFOLK.
Ipswich	E. C. SAYER.
Kendal	G. VOGT.
Kettering	W. HITCHMAN.
Kilmarnock	G. F. MERSON.
Kirkcaldy	DAVID STORRAR.
Leamington	H. HUTTON.
Leeds	F. P. SARGEANT.
Leicester	LEWIS OUGH.
Liverpool	R. C. COWLEY.
Louth	H. D. SIMPSON.
Malvern	A. MANDER.
Manchester	C. A. JOHNSTONE.
Montrose	A. DAVIDSON.
Morpeth	J. WHITTLE.
Newcastle-on-Tyne	T. MALTBY CLAGUE.
Newport (Mon.)	E. DAVIS.
Nottingham	G. J. R. PARKES.
Nuneaton	G. ILIFFE.
Oxford	G. CLARIDGE DRUCE
Paisley	A. FRASER.
Peterhead	J. F. TOCHER.
Plymouth	J. DAVY TURNEY.
Ross (Hereford)	T. MATTHEWS.
Salisbury	S. R. ATKINS.
Sheffield	G.T.W.NEWSHOLME.
Shrewsbury	W. G. CROSS.
Southampton	H. WILSON.
Southport	J. RIGHTON.
Spalding	E. WIGHTMAN BELL.
Stockport	J. C. ARNFIELD.
Stockton	W. J. CLARKE.
Sunderland	C. RANKEN.
Swansea	N. M. GROSE.
Taunton	W. A. WRENN.
Torquay	E. QUANT.
Tunbridge Wells	A. E. HOBBS.
Warrington	J. RYMER YOUNG.
Windsor	J. G. EVERETT.
Wolverhampton	F. J. GIBSON.
Worcester	C. W. TURNER.

The duties the Local Corresponding Secretaries have undertaken to discharge are briefly as follows:—

(*a*) To bring under the notice of pharmacists, principals, and their assistants, in their districts, who are unassociated with the Conference, the advantage of membership with it, and by personal effort to try and induce them to join.

(*b*) To assist in stimulating research by asking pharmacists, who have the time, ability, and disposition, to contribute from time to time a paper or useful note to the annual meetings.

(*c*) To endeavour to induce defaulters to continue their membership.

(*d*) To take generally a watchful and sympathetic interest in the affairs of the Conference.

To render those services voluntarily at times convenient to themselves and as opportunity offers.

THE

BRITISH PHARMACEUTICAL CONFERENCE.

AN ORGANIZATION ESTABLISHED IN 1863 FOR THE ENCOURAGEMENT OF PHARMACEUTICAL RESEARCH, AND THE PROMOTION OF FRIENDLY INTERCOURSE AND UNION AMONGST PHARMACISTS.

THE most important ways in which a member can aid the objects of the Conference are by suggesting subjects for investigation, working upon subjects suggested by himself or by others, contributing information tending to throw light on questions relating to adulterations and impurities, or collecting and forwarding specimens whose examination would afford similar information. Personal attendance at the yearly gatherings, or the mere payment of the annual subscription, will also greatly strengthen the hands of the executive.

A list of subjects suggested for research is published early in the year (see page 359). Resulting papers are read at the annual meeting of the members; but new facts that are discovered during an investigation may be at once published by an author at a meeting of a scientific society, or in a scientific journal, or in any other way he may desire; in that case, he is expected to send a short report on the subject to the Conference.

The annual meeting for 1904 will be held at Birmingham.

Gentlemen desiring to join the Conference can be nominated at any time on applying to the Secretaries, or any other officer or member. The yearly subscription is payable in advance, on July 1st. The amount, which includes free delivery of the Year-Book, is 7*s*. 6*d*. for members residing within the Postal Union. Further information may be obtained from

THE ASST. SECRETARY, BRIT. PHARM. CONF.,
17, Bloomsbury Square, London, W.C.

THE YEAR-BOOK OF PHARMACY.

The Conference annually presents to members a volume of about 600 pages, containing the proceedings at the yearly meeting, and an Annual Report on the Progress of Pharmacy, or Year-Book, which includes notices of all pharmaceutical papers, new processes, preparations, and formulæ published throughout the world. The necessary fund for accomplishing this object consists solely of the subscriptions of members. The Executive Committee, therefore, call on every pharmacist—principal, assistant, or pupil—to offer his name for election, and on every member to make an effort to obtain more members. The price of the Year-Book to non-members is ten shillings. The constitution and rules of the Conference, and a convenient form of nomination, will be found at page 364.

LIST OF CONTENTS.

PAGE
Introduction 1
Chemistry 15
Materia Medica 171
Pharmacy 225
Notes and Formulæ 293
Research List 323
Constitution and Rules of the British Pharmaceutical Conference . . 328
Honorary Members of the Conference 329
Foreign and Colonial Members 329
Home Members 332
Programme of the British Pharmaceutical Conference 351
General Index 507

INTRODUCTION

As the horizon of chemical knowledge has opened out with the advance of the army of investigators, and as the number of recruits to this army has grown immeasurably greater year by year, the necessity of specializing the work of these has become imperative. To the pharmacist, this advance and specialization is well brought home by a glance at the matter contained in the *Year-Book*, by comparing the contents of the volumes of earlier years with those of more recent date. It will thus be evident that, even in our own sphere of pharmaceutical chemistry, there is the same tendency to specialization, and to the concentration of the work of individuals in certain definite directions.

In consequence, it is no longer possible to usefully review the general chemical work of the current year in the space at our disposal. It has been necessary, therefore, to limit the abstracts in the chemical section of the book to those papers which deal more or less directly with subjects cognate to pharmaceutical work, to the exclusion of matter of purely scientific or academic interest. By so doing, it is hoped that this section will be rendered more valuable to practical pharmacists, and that the survey therein given may prove more thorough, by being limited to those subjects with which it is essential for them to be acquainted.

As in several previous years, the subject of the *arsenical contamination of drugs* has attracted much attention. An important *Report on the Detection of Arsenic in Official Drugs*, presented to the Pharmacopœia Committee of the General Medical Council by *W. R. Dunstan* and *H. H. Robinson*, has received the careful attention it deserves. *D. L. Howard* has voiced the opinion of the manufacturers, that certain of the requirements may be too stringent, in which he is supported by *E. W. Mann*, who considers, however, that in the majority of cases the limit required of 3 parts per million is not excessive or unattainable. *W. A. H. Naylor* and *E. J. Chappel* concur that the limit suggested by Dunstan and Robinson for *minera acids* and for *liquid ammonia* is too rigid, but consider that, in the main, the standards are acceptable. *C. A. Hill* and *J. C. Umney* are of opinion that in the case of *Ferrum redactum* the limit of 60 parts per million is not a practicable one. *F. H. Alcock,* however, has met with specimens containing but little arsenic, but these have proved to be contaminated with much siliceous impurity. *R. C. Cowley* and *J. P. Catford* suggest the use of a modification of Remsen's method for the detection of arsenic, and *H. Cantoni,* in a suggestive note, advocates its volatilization at normal temperatures as *methyl arsenious ether.* The presence of *arsenic* in objectionable quantity is noted by *E. Bonjean* in *sodium phosphate,* and in *hydrogen peroxide* by *L. Grimbert.*

F. H. Alcock suggests a simple volumetric method for titrating *barium chloride* ; *L. Robin* employs his sensitive *Mimosa flower* indicator for the detection of traces of *boric acid.* A simple expedient for the rapid solution of refractory *colcothars* is given by *E. Pozzi Estcot. E. J. Millard* draws attention to the adulteration of *cream of tartar* with *starch* ; *L.* and *J. Gadais* treat of the detection and determination of *lead* in the same. *Moreau* publishes a *volumetric method* for titrating *ferric chloride* with salicylic acid as indicator. *P. Planès* has a simple colorimetric method for the approximate assay of *hydrogen peroxide. D. B. Dott* draws attention to the inaccuracy of the official description and formula for the hydration of *lithium citrate. W. C. Anderson* deals with the different properties of *magnesia* from various sources. The detection of *mercury* in *urine* is discussed by *Sonnie-Moret* and by *Zenghelis.* A method for determining *potassium* as *picramate* is given by *A. Fribault,* while *E. P. Alvarez* finds that *iconogene* is a useful reagent for that metal. *J. Bougault* advocates the use of a modified Fremy's reagent to detect *sodium.*

Among the metallic salts which have been prepared, and are likely to be of interest, are those of *bismuth* with *benzoic* and *salicylic* acids, by *P. Thibault* ; *ferrous* and *ferric arsenate,* by *W. Duncan* ; the *perborates,* and specially *sodium perborate,* by *J. Bruhat* and *H. Dubois.* The organic salts of *thorium* have been described by *G. T. Morgan. P. Lami* indicates *potassium percarbonate* as source of *oxygen* or of *hydrogen peroxide,* and *E. Holdemann* gives a formula for the preparation of *zinc borate.*

The occurrence in beryl of a *new element* allied to glucinum is foreshadowed by *J. H. Pollok.* A note of great practical value on the application of *copper sulphate* for the destruction of freshwater *Algæ* and *Confervæ* has been made by *G. T. Moore. J. Wadmore* has prepared *sodium alum*, and *O. Silberrad* has definitely settled the disputed formula for "*nitrogen iodide.*"

In the chemistry of vegetable drugs, a notable event is the completion of the systematic examination of the *Elemis* by *A. Tschirch* and collaborators, the summary of which is now published, together with the result of the examination of *Tacamahaca elemi* and *resin*, by the same author and *O. Saal.* With *O. Mueller, Tschirch* is now submitting *guttaperchas* to a similar systematic examination, and has published important work on *New Guinea and Sumatra gutta perchas. Copaiba balsam* receives its perennial share of attention from the hands, this year, of *Schimmels*; while *van Italie* publishes a note on *Surinam copaiba. E. G. Wilcox* records experiments on the influence of metals and other bodies on the oxidation of *guaiacum resin. Oregon Balsam* is the subject of notes from *F. Rabak*; *H. Thoms* and *A. Biltz* put on record the constituents of *white Peruvian balsam. C. Ahrens* and *P. Hett* give a simple test for the purity of *storax.*

An addition to the number of *sugars*, in the form of *aloinose*, has been effected by *E. Léger*; and *G. Bertrand* announces the occurrence of a new hexose, *sorbierite*, in the berries of the mountain ash. *M. Harlay* by the action of ferments, reveals the presence of *saccharose* in a large number of plants. *Brisson* gives the characters of *maple sugar*; *E. Bourquelot* describes the constituents of the *sugars* of *Cocos nucifera* and of *Borassus flabelliformis*; *E. Senft* shows that *sugars* may be detected by a *microchemical reaction* as osazones. *A. Brachin*, working in the light of the researches of Bourquelot and Hérissey, establishes the widespread presence of the ferment *lactase* in the vegetable kingdom, and *E. Bourquelot* and *H. Hérissey* find *trehalase* almost universally in the *Fungi.*

G. Guérin gives a series of distinctive colour reactions for *alcohols*; *P. Sabatier* and *J. B. Senderens* afford a method of distinguishing *primary, secondary*, and *tertiary alcohols.* Discussing the method of *Burgess* for the determination of *aldehydes* and *ketones, Schimmels* state that it is not so widely applicable as that author claims. *S. P. Sadtler* modifies the process of *Mulliken* and *Scudder* for the detection of *methyl* *alcohol* in ethyl alcohol, and *E. P. Alvarez* employs sodium dioxide as a reagent to distinguish *polyphenols.*

The *Essential Oils* continue to attract much attention. *MacCandless* gives a method for the detection of *adulteration* with *turpentine. Schimmels* note the admixture of *castor oil* and *West Indian sandal oil* with *sandal oil* sold in capsules. They also call attention to the prevalent adulteration of *Cananga oil* with *coconut fat*; of *hop oil* with *gurjun balsam*; of *French lavender oil* with *ethyl succinate* and so-called *Spanish lavender oil*; also to the presence on the market of *lignaloe oil* which has been deprived of the greater part of its *linalol. E. J. Parry* has found *lemongrass oil* to be fraudulently mixed with *citronella oil*; *C. T. Bennett* has met with *castor oil* in *eucalyptus oil.*

Many new essential oils have been examined, among which that of *Backhousia citriodora,* reported on by *Schimmels* and the Chemical Department of the *Imperial Institute,* is notable for its high percentage of *citral. Haensel* gives characters of *Cochin* and *African ginger oils. Schimmels* have identified the new alcohol in *gingergrass oil* as *dehydrocuminol,* and have isolated numerous constituents from *lemon-petitgrain oil. R. T. Baker* and *H. Smith* have published a useful summary of their long investigation of the *Eucalyptus oils J. C. Umney* and *C. T. Bennett* report on the *oil of Eucalyptus polybracteata. E. M. Holmes* endorses the opinion of others that probably *cineol* is not the active therapeutic constituent of these oils. *J. C. Umney* and *C. T. Bennett* record the characters of *Sicilian peppermint oil*; *Schimmels* those of the *French* product, and *P. van den Wielen* of *Javan oil.*

Among the *pine oils* and their congeners, *Troeger* and *Beutin* give the characters of that of *Pinus strobus*; *Haensel,* of *Pinus silvestris buds*; *Schindelmeiser,* of *Siberian fir oil*; *E. Sundwick,* of *Finnish pine tar oil*; and *E. F. Ziegel* records some practical results in the distillation of *savin oil,* calling attention to the varying official descriptions of this product. *Etz* has examined *Greek turpentine oil* from *Pinus halapensis.*

W. H. Simmons has continued his study of the iodine absorption of *rose oil. P. Jeancard* and *C. Satie* give characters of authentic specimens of varieties of *French otto* and of the genuine *Bulgarian* product; *Schimmels* also publish standard figures for the latter. Attention is drawn by the same firm to the use of *Spanish rosemary oil* as an adulterant. They again complain of the unsatisfactory nature of the characters and tests of the British Pharmacopœia for *nutmeg oil.* They give a detailed description of the manipulation of the test for *chlorine* in *bitter almond oil,* and comment on the unsatisfactory nature of *Bamber's test* for *citronella oil* now officially enforced in Ceylon. *E. Berti* returns to the vexed question of the determination of *aldehydes* in *lemon oil,* and gives details of his process. *J. Lothian* contributes to the methods for the determination of *camphor* in oily solutions. *H. W. Simmons* suggests that the *refractive index* of *clove oil* may be taken as an indication of its eugenol content. *H. Thoms* has established the similarities and differences of *dill-* and *parsley-apiols. E. Charabot* and *G. Laloue* have continued their bio-chemical researches on the formation of essential oils, and their constituents in the living plant, having observed the production of *neroli oil* in *Citrus bigaradia,* the formation of *volatile acids* in plants, and of *essential oils* in *annuals.* New constituents have been detected in *caraway oil* by *Schimmels,* also in *palma rosa, patchouli, opopanax,* and *cypress oils. H. Thoms* finds that the so-called matico ether of *matico-oil* is a mixture of *dill-* and *parsley-apiols. P. von Romburgh* has isolated a new terpene *ocimene.* from *Ocimum basilicum oil.*

D. Hooper contributes an interesting note on *Indian beeswax. Schwarz* deals with the analytical factor of the *saponification* of bees-wax, and *P. Lemaire* shows that, in some instances, adulteration may be detected by the examination of the *fictitious colouring matter. Fixed oil* of *Calophyllum inophyllum* has been examined by *G. Fendler,* and also that of the fruit of *Carthamus tinctorius. F. B. Power* and *M. Barrowcliff* communicate an important investigation on the oil of *Gynocardia odorata,* showing its total difference from the semi-solid *chaulmoogra oil.* They have also examined the fatty oil of *Hydnocarpus wightiana* and of *H. anthelmintica.* Amendments of the official characters and tests for *castor oil* emanate from *Myddleton Nash* ; while strong adverse criticism on the obsolete reactions and tests given for *cod liver oil* in the official work, which were responsible for legal proceedings in this country, have been passed by *J. C. Umney* and *C. T. Bennett* ; also by *E. J. Parry,* who all suggest amendments to the official monograph. Contributions to the same subject have been made by *J. F. Liverseege, Schamelhout,* and *E. H. Gane. E. J. Parry* shows that *Japan wax* has undergone an alteration in character. *E. Fulmer,* by direct experiment, finds that the *lard* of hogs fed on *cotton-seed meal* will long give analytical reactions which might lead to the inference of adulteration with *cotton-seed oil.* *J. Bellier* indicates a method for detecting *nut oil* in olive and other oils; *C. A. Crampton* and *F. D. Simon,* for the presence of *palm oil* in other fats. *A. L. Dohme* treats of the *fixed oil* of *Podophyllum peltatum.* *F. Wiedermann* gives a reaction for the detection of *rancidity* in fats. *F. Telle* indicates how definite results of great analytical value may be obtained by the observation of the *bromine absorption* of *fats.*

H. A. D. Jowett and *C. E. Potter* do not agree with *E. Léger's* statements as to the formula of *barbaloin,* but confirm that of *Tilden.* *E. Léger* has further elucidated his theories as to the constitution of *methyl-natalo-emodin* and *natalo-emodin.* *A Tschirch* and *Hoffbauer* deal with the constituents of commercial varieties of *aloes.* *D. H. Braus* finds the glucoside of *capers* to be a rhamnoside allied to *rutin,* which he has named *caper-rutin*; he has also isolated another rhamnoside, *sophorin,* from the flowers of *Sophora japonica,* and has established the disputed formula of *quercitrin.* *E. Bourquelot* and *H. Hérissey* find that a specific ferment, *gease,* accompanies the glucoside *gein* in the roots of *Geum urbanum* *F. B. Power* and *F. H. Lees* have continued their investigation of the cyanogenetic glucoside *gynocardin*; *M. Greshoff* also communicates a note on the subject, confirming the results obtained by the first-named authors. *J. S. Hills* and *W. P. Wynne* have conducted an arduous research on *Linum cartharticum,* establishing the formula for *linin,* and showing that it is not the purgative principle of the plant. *Christofoletti* applies the colorimetric method of *Tschirch* to the determination of the active constituents of *buckthorn bark, cascara bark, senna,* and the *aloes* *A. Tschirch,* with *Christofoletti* and also *Hoffbauer,* have been engaged in similar investigations on *aloes* and *rhubarb.* *J. Warin* has devised an ingenious colorimetric process for the determination of *emodin* in drugs containing it. *H. A. D. Jowett* has published an exhaustive research on the chemistry of *cascara bark.* *N. A. Valiashko* has further investigated *robinin.* *Brieger* and *Krause* have obtained from the spear poison of the Cameroons a large amount of *strophanthin.*

The number of new alkaloids recorded during the year is not great, and of these two have been found by *T. Gadamer* and *O. Haars* in the herbs *Corydalis cava* and *C. solida,* thus further increasing the number of *Corydalis* alkaloids. A new base, *Oxylupanine*, has also been found by *G. F. Bergh* in the seeds of *Lupinus polyphyllus*. *Tyrosine* has been detected in the berries of *Sambucus niger* by *J. Sack* and *B. Tollens*. *Alboni* records the occurrence of two bases, *cecropidine* and *cecropine*, in *Cecropia peltata*, and *J. Honda* gives a definite formula and characters for *skimmianine* from *Skimmia japonica*. The poisonous alkaloids of *Zygadernus venonosus* are found by *H. B. Slade* to belong to the *veratrine* group. *H. Thoms* suggests a general method for determination of *alkaloids* by precipitation with potassium bismuth iodide. *P. Lemaire* shows that *antipyrine* may be quantitatively precipitated and determined with *picric acid*. *W. C. Forsberg* gives a method for the determination of *alkaloid* in *belladonna* leaves. The two *Petits* give the outline of a process for the *morphinometric* determination of *opium*. *D. B. Dott* again reverts to the same subject, and criticises the official statements concerning *morphine hydrochloride*, *acetate*, and *apomorphine hydrochloride*. The increasing use of *nicotine* as an agricultural poison renders useful a method for its determination in the presence of pyridine, as outlined by *J. A. Emery*. *C. Reichard* publishes a series of reactions for distinguishing *nicotine, conine*, and *sparteine*. The same author gives new reactions to differentiate *quinine* from *cinchonidine*; *Battandier* gives a reaction for separating *quinine* and *quinidine*. *Vigneron* details a method for determining *quinine* in the total alkaloids of *cinchona barks*. *H. Carette* describes the two *quinine hydrochlorides*, but *C. Erba* does not agree with all his statements relative thereto. *W. Duncan* deals with the *solubility of quinine* in ammonia, and gives a method for the valuation of *quinine sulphate*. *B. H. Paul* speaks with authority on the value, under proper manipulation, of the "ether test" for *cinchonidine* in *quinine sulphate*. One of the most important papers recently published on the subject of the alkaloids is that by *E. Schmidt*, in which *Datura metel* is found to be the best source of *scopolamine*, and in which the nature of the *mydriatic alkaloids* in other Solanaceous plants is discussed. *R. Wright* has found distinct traces of the presence of a mydriatic alkaloid in *Lactuca muralis*. *H. M. Gordin* has further examined the alkaloid *calycanthine*. *C. E. Caspari* publishes a method for the determination of *codeine* in opium. *C. Reichard* gives some new reactions for *conine* and *nicotine* and for *cocaine* and *morphine*; *E. Alvarez* the same for *aconitine*. *H. A. D. Jowett* has succeeded in converting *isopilocarpine* into *pilocarpine*, these bases being considered to be stereoisomers. The same worker describes some *synthetic bases* obtained in the attempt to prepare bases resembling pilocarpine. *A. Astruc* has prepared two *glycerophosphates of piperazine.*

D. Hooper reports on the chemistry of *Gymnostachyum febrifugum,* and on the leaves of *Melia azadirachta.* *E. M. Holmes* affords interesting information on "*mallet bark*"; *A. E. Leach* gives results of the analysis of three commercial varieties of *turmeric.*

In the records of organic analytical work, tests for *formaldehyde* are again prominent, processes for its *determination* being given by *C. E. Male, W. Fresenius* and *Gruenhut,* and by *F. Bonnet*, while *A. Trillat* has made the suggestive discovery that it is generated in sufficient quantity by the combustion of certain organic bodies to render these serviceable disinfectants when burned, and that formaldehyde is present in marked quantity in the air of large towns *E J. Parry* has contributed another note on the adulteration of *civet.* *J. Thompson* warns against the presence of the toxic body *paraphenylenediamine* in *hair dyes,* and gives a method for its detection. *E. Payet* avails himself of the presence of oxydase in *gum acacia* to detect that gum when fraudulently mixed with powdered *tragacanth.* *Villiers, Magnier de la Source, Rocques* and *Fayolle* collaborate on a method for the detection of *saccharin* in beverages. *Pasteureau* has discovered *acetyl-methyl-carbinol* as a constituent in certain *vinegars* *A. Trillat* and *Turchet* employ potassium iodide and a hypochlorite to detect *ammonia* in waters, but *Cavalier* and *Artus* point out that the sensibility of the reaction is not comparable with that of the familiar Nessler reagent.

The section devoted to *Materia Medica* has this year been more strictly set aside for the consideration of therapeutic notes and of processes and drugs which cannot be strictly classed as chemical. *F. Rabak* attributes *Oregon balsam* to *Abies amabilis* and *A. nobilis,* the oleoresins of which he describes. *E. M. Holmes* considers that a *so-called false calumba* which has occasionally appeared in the drug market is merely a portion of the woody root-stock of the true plant. The same authority describes the fruits of *Hibiscus sabdarilla,* and again communicates a note on *commercial jaborandi leaves,* also a short note on *poisonous West Australian plants.* Among the interesting papers on Indian *Materia Medica* published by *D. Hooper* may be noted those on *Acorus calamus* root, on *Burmese drugs,* on *Rusot,* and on *Trombidium grandissimum*. *P. Lemeland* describes the gum of *Cochlospermum gossypium* and of *Feronia elephantum*, and *H. Jumelle* that of *Stereospermum euphorioides*. *Schimmels* quote from a foreign source a description of the collection of *Gurjun balsam*. *H. Thoms* gives an interesting note on *opium* from *German grown* poppies. *J. Schindelmeiser* deals with *Persian opium*, and *V. Masson* throws light on the fabrication of the so-called "manipulated" *Smyrna opium* of low morphine value. *A. Tschirch* does much to trace commercial *rhubarb* to its true botanical sources. *P. S. Roncey* has written a thesis containing much information on *Orchil*. The commercial and botanical varieties of *mustard seeds* have been dealt with very thoroughly by *C. Hartwich* and *A. Vuillemin*. *W. Busse* enumerates many *medicinal plants* of German East Africa. *C. Mannich* and *W. Brandt* describe an *ipecacuanha adulterant*, and *P. Planes* distinguishes between true and false *Aya Pana*. *H. Furness* gives a picturesque account of the collection of the valuable *Borneo camphor*. *J. Herzog* deals with a *false Yohimbi bark*. *E. André* describes very fully the method of collecting and curing *Tonka beans*. *E. Dribble* and *F. A. Upsher Smith* trace Derbyshire *valerian root* as the product of *Valeriana mikanii*.

Among new remedies no introduction of first importance seems to have been made. *E. Rochard* has called attention to the danger in prescribing *naphthol camphor*; *Fucol* is stated by *G. Fendler* to by no means replace cod liver oil, as claimed. *Exodin* is found by *F. Zernik* not to be the compound stated by its patentees. *D. B. Dott* shows that *diacetylmorphine hydrochloride* was first prepared by *Alder Wright* and *Becket*, years before its claimed discovery in Germany, where it was graced with the name "*heroin*." The same authority considers that *ethylmorphine hydrochloride*, known as "*dionine*," has no special virtues, being almost identical with codeine in its action. *P. Zepf*, apparently unaware of the work of *Wild*, and even that of his compatriot, *Lewen*, on the pharmacology of the *alkaloids of ipecacuanha*, has obtained results which confirm those of the prior investigators.

Useful summaries of the therapeutics of *adrenaline*, also of *atropine methyl bromide*, are published in *Merck's Report*, a work from which many abstracts of value to pharmacists have been obtained. Among the more striking novelties may be noted *isophysostigmine*, stated by *Ogui* to be preferable to physostigmine for ophthalmic work; *hydroxyl-propane di-iodide,* or *iothion,* used for the absorptive administration of iodine; *isoform,* an iodoform substitute; *isopral,* trichlor-iso-propyl alcohol, a chloral substitute; *digalene,* a soluble digitoxin; *cuporphine,* apomorphine bromethylate; and *perhydrol,* a concentrated neutral solution of hydrogen peroxide, which appears to be of undoubted value as a non-irritant antiseptic. *A. Robin* and *Barbier* give an interesting note on a new treatment of pneumonia by means of so-called "*metallic ferments.*" *F. W. Gamble* ably summarizes the distinctive characters and properties of the various *tuberculins* at present supplied.

Many papers of exceptional practical value are available for abstraction in the section of *Pharmacy.* It is hoped therefore that this section will prove of real service to the practising pharmacist. In the important subject of *incompatibility,* attention is drawn by *G. Denigès* to the combination taking place between *nirvanine* and *mercuric cyanide*; *Robert* reverts to the time-worn subject of the incompatibility of *antipyrine* with *cinchona extracts*; *A. B Lyons* treats of the behaviour of the *cinchona alkaloids* with *ammonium acetate solution*; *Crouzel* deals with similar cases with *ammonium acetate* and *cinchona extract*; *Barillé* of the precipitate formed with *cherry laurel water* and *alkaloidal solutions.*

The approaching publication of the new edition of the *Codex* has stimulated investigation on the part of French pharmacists, and induced the publication of many useful notes. Prominent among these workers is *L. Grimbert,* who gives processes for *tannin pessaries and suppositories, sterilized catgut, saline solution of gelatin for hypodermic injection, podophyllin and belladonna pills, extract and syrup of maize stigmata,* for the *assay of iodoform gauze,* for *extract of hyoscyamus, gelatin ovules, liquid* and *solid extract of ergot, creosote wine,* and *belladonna extract.* The same author deals with *iodotannic syrup,* for which formulæ are also given by *L. Martin* and *Vigneron,* and, in England, by *H. Wyatt. Farr* and *Wright,* continuing their work on *standardized powdered alcoholic extracts,* treat of *belladonna leaves* and *root* in that form. *Elsie S. Hooper* also contributes a note on the *extraction* of *belladonna root* with alcohol and on the preparation of *liquid extract of cinchona. W. H. Lenton* has communications on *confection of senna* and on *conium ointment. H. G. Greenish* contributes to the pharmacy of the *liquid extract of pareira, iron pill, carbolic acid ointment, liniment of mercury,* and suggests alterations in the formulæ of *syrups of balsam of Tolu, rhubarb,* and *Virginian prune. E. W. Lucas* deals with the official test for *pepsin* ; with *A. D. Dick* gives the results obtained in the manufacture of *official tinctures* extending over a period of six years; and with *H. B. Stevens* publishes a note on *compound tincture of cardamoms. H. Wyatt* deals with *citrate of iron and quinine* in prescriptions, with the manipulation of *bark mixtures, insoluble powders,* the use of *hypophosphorous acid in dispensing,* and with *copaiba mixtures. M. D. Hodges* and *F. E. Niece* contribute yet more formulæ for *cold cream* ; the latter also gives recipes for *capsicum petroleum liniment, benzoinated paraffin,* and for *petroleum emulsion.* Formulæ for the last preparation are also given by the *Formulary Committee* of the *American Pharmaceutical Association, S. A. MacDonnell,* and *E. F. Cook. G. Pinchbeck* gives a method for producing *ferment-free acacia mucilage. A. R. S. Dohme* comments on *acetic extracts. T. Fawsett* publishes a test for the kind of *Aloes* in compound *rhubarb pills. E. A. Ruddiman* gives practical notes on the behaviour of *cacao butter* with certain bodies. *P. van der Wieler* advocates the use of a *soap* prepared from this fat for use in *dentifrices. A. Boyd* shows how *camphor liniment* may be prepared without loss of camphor. *A. W. Gerrard* gives a useful note on *mustard paper. E. Wild-Borbeck* recommends an oily sterilized solution of eserine for ophthalmic use, under the name of *eserinol. Baroni* directs attention to the importance of employing perfectly *neutral glass* for storing *alkaloidal solutions. J. Lothian* and also *F. Merson* criticise the official process for *solution of lead subacetate,* and the former gives an improved formula. The subject of *infusions* receives attention from *A. Currie,* who gives methods for preparing these in an *aseptic* condition. *H. Deane* and *G. E. Pearson* deal with *concentrated infusions. J. Evans* gives analytical figures for *compound licorice powder. Liniment of potassium iodide with soap,* that fruitful source of trouble to dispensers, is the subject of communications from *J. H. Shuttleworth* and *P. Boa. W. H. Lenton* would amend the official directions for the preparation of *liquid extract of taraxacum. Mercuric nitrate ointment* is the subject of a note by *C. O. Snavely. E. A. Ruddiman* discusses the dispensing of *tincture of myrrh* in aqueous solutions. *E. Bourquelot* suggests a formula for *nux vomica extract. H. W. and S. C. Gadd* summarize the results of observations of five years' work on *galenicals. Marpmann,* in a suggestive note, calls attention to the presence of bacteria in *gelatin plaster-masses.* Pill excipients for special cases are dealt with, among others, by *W. Duncan, J. W. Penderleith,* and *A. Joirssen. H. C. T. Gardner* reopens the often discussed question of *water displacement* in the preparation of *tinctures. W. S. Scoville* finds *spermaceti* to be valuable for hardening *suppositories. D. A. Young* criticizes the official directions for preparing *compound pill of galbanum.* Lastly, the useful notes by *A. Kremel* on the *assay of medicated dressings* are worthy of attention.

Among the "Notes," attention may be directed to the very practical hints on the *cultivation of medicinal plants*, by *E. M. Holmes*, which will be welcome to most pharmacists. An important recommendation for the dealing with *sheep scab* emanates from the *Board of Agriculture. C. N. Choplin* enumerates a number of *coaltar colours* which are unsuited for use either for textile dyeing or for dietetic purposes. Microscopists will note with interest *O. Richter's* experiments on the cultivation of *diatoms.*

The formulæ, as previously, have been mainly selected for their evident practical value or possible suggestiveness.

CHEMISTRY

YEAR-BOOK OF PHARMACY

PART I

CHEMISTRY.

Acid Formic, New Reaction for. E. Comanducci. (*Journ. Pharm. Chim.* [6], **21,** 320.) Dilute solutions of formic acid give a pale yellow colour in the cold with strong aqueous solution of $NaHSO_3$, which becomes orange on boiling, the tint ultimately disappearing. This test will detect from 1 to 1·5 per cent. of formic acid in formaldehyde : the liquid to be tested should first be diluted with an equal volume of water, and each 2·5 c.c. treated with 15 drops of a 1 : 1 solution of $NaHSO_3$, then cautiously warmed.

Aconitine, New Reaction for. E. P. Alvarez. (*Comptes rend.*, **140,** 1540.) A minute quantity of the alkaloid (from 0·0005 to 0·002 Gm.) is treated in a small porcelain capsule with a few drops of bromine and gently warmed on the water bath ; 1 to 2 c.c. of fuming HNO_3 is then added and the mixture evaporated to dryness. The yellow residue is then treated with 0·5 to 1 c.c. of saturated alcoholic solution of pure KOH, and again evaporated to dryness and cooled. To the cold residue is then added a few drops of 10 per cent. $CuSO_4$ solution, which is run over the surface of the residue ; an intense green colour is rapidly developed.

Albumin in Urine, Detection and Determination of. H. Bellocq. (*Annales de Chim. Analyst.*, **9,** 384.) 100 c.c. of perfectly bright urine is treated in a 300 c.c. flask with an excess of a soluble lime salt, such as 1 Gm. of calcium acetate. The mixture is then made distinctly alkaline with ammonia and gently boiled, until the froth formed is clear and light, breaking up quickly when the flask is withdrawn from the gas flame. The precipitate, consisting of urate and oxalate of lime, with any albumin present, is then collected, and transferred while moist to a test tube. It is then treated with 3 c.c. of HNO_3, which at once dissolves the oxalate and slowly decomposes the urate, which effervesces, but does not attack the albumin. When all trace of evolution of gas has ceased the tube is filled with strong alcohol. and shaken up. A greater or less opacity will be evident, according to the amount of albumin present. On standing, a flocculent precipitate is formed which may be collected, dried in the air on a moderately warm tile, and weighed.

Alcohols, Colour Reactions for. G. Guérin. (*Journ. Pharm. Chim.* [6], **21,** 14.) The following colour reactions are distinctive of the alcohols named, and colours are given by all alcohols except ethyl and methyl alcohol, and by all bodies possessing an alcoholic or hydroxyl function. One c.c. of the alcohol, or, if solid, a solution of the substance in strong H_2SO_4, is mixed in a test-tube with 5 or 6 drops of saturated aqueous solution of furfural, followed by an equal volume of strong sulphuric acid ; on mixing, the characteristic colour is developed. If only small quantities are available, the test may be performed with drops, on a porcelain surface, mixing with a glass rod. Under these conditions *normal propyl alcohol* gives a deep violet colour ; *secondary propyl alcohol*, reddish violet ; *isobutyl alcohol*, blue violet ; *active amyl alcohol*, violet ; *amyl alcohol* of fermentation, violet ; *caprylic alcohol*, violet red ; *glycol*, reddish violet ; *propylglycol*, purple violet, rapidly changing to brown ; *glycerol*, reddish violet ; *allyl alcohol*, reddish brown, with immediate decomposition ; *menthol*, in alcoholic solution, blue ; *mannite* in H_2SO_4 solution, dull greenish brown, in alcoholic solution, brownish violet ; *glucose* in H_2SO_4 solution, brownish violet ; *lactose* in H_2SO_4 solution, brownish ; *malic acid* in alcoholic solution, brownish violet ; *tartaric acid* in alcoholic solution, brownish violet ; *citric acid,* in alcoholic solution, reddish violet ; *lactic acid,* reddish violet ; *cholesterol,* blue ; *phenol,* reddish violet ; *thymol* and *guaiacol* in alcoholic solution, violet , *orcine,* blue ; *hydroquinone,* dull blue ; *pyrocatechin,* deep violet ; *resorcin* and *phloroglucin,* violet ; *pyrogallol,* reddish violet. All these are tested in alcoholic solution.

Alcohols, Primary, Secondary, or Tertiary, New Method of Distinguishing. P. Sabatier and J. B. Senderens. (*Bull. Soc. Chim.*, **33,** 263.) By passing the vapour of alcohols in a very fine stream delivered from a capillary tube over a train of freshly prepared reduced copper laid in a glass tube and heated over a gauze, the extremity of this reducing tube being fitted to a cooled receiver, the nature of the alcohol may be determined by its reduction products. In the case of a primary alcohol, hydrogen and the aldehyde corresponding to the alcohol are formed. With a secondary alcohol, hydrogen and the respective ketone is produced. Tertiary alcohols are split up into water and an ethylene carbide, which is usually liquid. On adding Caro's reagent (solution of fuchsine exactly decolorized with SO_2) to the product, the production of a red tint indicates the presence of an aldehyde, and that the original alcohol is primary. If no colour be given, semicarbazide hydrochloride 1 Gm., potassium acetate 1 Gm., and water 6 c.c. are added, when the formation of a precipitate indicates the existence of a ketone, from a secondary alcohol. If neither of these reactions are obtained, the alcohol must be tertiary, and the distillate will immediately decolorize a drop of bromine.

Aldehydes and Ketones, Determination of, by Neutral Sulphite Method. (*Schimmel's Report*, May, **1905**, 103.) Discussing the method of Burgess (*Year-Book*, **1904**, 17), it is stated that the method cannot be so generally applied as the author claims. It is found to give good results in the determination of carvone, but a correction is necessary for the expression of results in weight, since the volume determination is necessarily lower on account of the sp. gr. of the ketone ; it is also useful for pulegone determination, for citral, and for cinnamic aldehyde, although no very marked superiority over the bisulphite method was apparent with the two last. With citronellal, the neutral sulphite method was not found to give good results.

Alkaline Fluorides, Detection of, in Meat Foods. J. P. Froidevaux. (*Journ. Pharm. Chim.* [6], **20,** 11.) Alkaline fluorides appear to be used widely as preservatives for meat, sausage meat and similar comestibles liable to putridity. The following method of detecting these objectionable preservatives is simple and rapid. Thirty Gm. of the finely-chopped material, treated with 2 c.c. of 50 per cent. Na_2CO_3 solution, is ashed to a dull red heat in a platinum dish. When the organic matter is destroyed, the carbonaceous residue is powdered and boiled with 5 or 6 c.c. of distilled water in the same capsule, and filtered. The cold filtrate is rendered slightly acid with pure HCl, and a few drops of helianthin is added; then a saturated solution of ammonium acetate is added until a yellow colour is evident. The HCl is thus neutralized, and the free $HC_2H_3O_2$ prevents the precipitation of phosphates. One or 2 c.c. of a 1 : 5 solution of $CaCl_2$ is then added. A turbidity or precipitate indicates the presence of fluorides. This may be confirmed by Sanglé Ferrières' method after boiling the liquid, collecting the precipitate, drying and mixing with sand and H_2SO_4.

Alkaliverdin, Colouring Matter of Sarracenia Purpurea. G. M. Meyer and W. J. Gies. (*Amer. Journ. Physiol.*, through *Journ. Pharm. Chim.* [6], **21,** 411.) *Sarracenia purpurea,* which is employed in the United States as a popular remedy for dyspepsia, contains a proteolytic ferment which acts at a relatively low temperature, and a colouring matter, alkaliverdin. Alcohol extracts chlorophyll, alkaliverdin and a brown colouring body. Water extracts only the two latter. The brown matter is eliminated by evaporating the aqueous extract almost to dryness *in vacuo,* and extracting the residue with absolute alcohol, which dissolves only alkaliverdin; this is obtained as a syrupy liquid by evaporation *in vacuo.* It has a bitter taste and an odour resembling that of caramel, being accompanied by saccharine impurities. These are removed by fermentation, which has no effect on the pigment. The aqueous solutions of this syrup are reddish, and become green in the presence of a trace of alkali, reverting to red when this is neutralized; excess of acid gives a rose red tint quite distinct from the shade of the neutral solution. These changes of colour are very sharp, with extreme dilutions of the colouring matter. It is useful as an indicator in alkalimetry.

Alkaloids, Determination of, with Potassium Bismuth Iodide. H. Thoms. (*Berichte Pharm.*, **15.** 85.) The precipitating reagent is prepared by dissolving bismuth subnitrate 80 Gm. in HNO_3 sp. gr. 1·18, 200 Gm., and pouring this solution into a strong solution of KI, 272 Gm. in water. The greater part of the KNO_3 formed crystallizes out. This is removed and the liquid evaporated to 1 litre.

Extract of belladonna is taken as a typical substance to illustrate the method. Two Gm. is dissolved in 50 c.c. of water acidified with 10 c.c. of 10 per cent. H_2SO_4. To this solution 5 c.c. of the above reagent is added, drop by drop, with constant stirring. The precipitate formed is collected at once, and washed twice with 5 c.c. of 10 per cent. H_2SO_4. The drained filter containing the precipitate is transferred to a stoppered flask, and treated with 0·30 Gm. of Na_2SO_3 and 30 c.c. of 15 per cent. NaOH. After thorough and prolonged agitation to liberate the alkaloids, 15 Gm of NaCl and 100 c.c. of ether are added, the whole being thoroughly shaken up. After separation of the ether, exactly 50 c.c. is pipetted off and the amount of alkaloid determined therein by titration with N/100 HCl with iodeosin indicator. The number of c.c. used up × by 0·289 gives the amount of total alkaloids present, calculated into atropine.

Aloes, Valuation of. A. Tschirch and — Hoffbauer. (*Schweiz Woch. für Chem und Pharm.*, **42**, 12.) Since the resin of aloes is the only inactive constituent, a fair approximation of the value of the drug may be made by determining the non-resinous portion as follows. Five Gm. of aloes is macerated for 2 hours in a 50 c.c. flask with 5 c.c. of methyl alcohol; 30 c.c. of chloroform is then heated to 50–60° C. and added gradually with thorough agitation to the methyl alcohol and aloes mixture. After allowing to stand for half an hour for the resin to deposit, the chloroform solution is transferred through a filter to a small tared Erlenmeyer's flask and the chloroform distilled off. The distillate is put back on the resinoid residue and the extraction and distillation repeated therewith four times. After the final extraction the non-resinoid residue is dried and weighed. Good Cape aloes should contain at least 80 per cent. of non-resinous constituents.

The following are the chief constituents of commercial aloes.

Variety.	Aloin	Other Chrysammic Acid yielding bodies soluble in CH_3HO and $CHCl_3$	Substances not yielding Chrysammic acid soluble in CH_3HO and $CHCl_3$	Resin.
	per cent.	per cent.	per cent.	per cent.
Cape Aloes, soft . .	20	55	11·8	13·2
Cape Aloes, hard . .	16	59	6·2	18·8
Uganda ,, . .	16	34	30·4	19·6
Barbados ,, . .	18	32	22·4	27·6
Curaçao ,, . .	18	32	16·6	33·4
Socotrine ,, . .	8	25	3·6	63·4

This confirms the fact that Cape aloes contain the largest quantity of active constituents.

Recognition of Cap-aloin. A 1 : 1000 aqueous solution of the aloes gives a green fluorescence on the addition of 5 per cent. of powdered borax.

Recognition of Aloe-emodin. Ten c.c. of an aqueous 1 1000 solution of aloes is shaken for a minute with 10 c.c. of benzol. The separated benzol is withdrawn, and shaken with 5 c.c. of strong solution of ammonia. A rose colour is developed.

Distinction of Cape Aloes from Barbados Aloes. Ten c.c. of a 1 : 1000 aqueous solution of aloes is treated with a drop of 5 per cent. $CuSO_4$ solution. An intense yellow colour is developed by Cape aloes, which, after the addition of a trace of NaCl and a little alcohol, does not change to red.

Distinction of Cape Aloes from Natal Aloes. A spot of the yellow solution obtained by the action of strong H_2SO_4 on the aloes, placed in porcelain capsule, should not develop a green colour with a trace of fuming nitric acid.

Anthraquinone Reaction of Aloes. One Gm. of the aloes is treated in a porcelain capsule with 20 c.c. of concentrated HNO_3 and heated on the water-bath for two hours, the evaporated acid being made up from time to time; evaporation is then carried to dryness, and the residue, treated with water, leaves an insoluble brown powder. This dissolves in water containing ammonia, giving a violet-red colour.

Aloinose, the Sugar of Aloins. E. Léger. (*Journ. Pharm. Chim.* [6], **20,** 145.) When barbaloin or isobarbaloin are moistened with alcohol 90 per cent., and kept in a closed vessel for a long time, although the aspect of either aloin does not materially change, except by becoming reddish brown, both undergo profound modification. After the lapse of two years the mixtures entirely lost their bitter taste, and the mass contained numerous acicular crystals. This product was warmed with a little alcohol, then freely diluted with water, and the orange precipitate filtered out. The aqueous orange red filtrate was easily decolorized with animal charcoal. When evaporated at a low temperature, or over H_2SO_4, it affords a pale yellow syrup which gives the following reactions. When heated with H_2SO_4 it gives off fumes which redden aniline acetate paper; when heated with fuming HCl and a small quantity of orcin, it gives a red colour, quickly turning green, and on continuing the boiling forms a dull green precipitate, which, when cold, redissolves in ether, giving a fine green solution, passing after several days to a bluish shade. With phenylhydrazine acetate the sugar forms a crystalline osazone composed of yellow lamellæ grouped in rosettes. Aloins have been shown not to afford any sugar by the action of dilute acids, nor are they hydrolized by emulsin or the ferment of *Aspergillus niger*.

Amomum mala, Essential Oil of Fruit of. (*Schimmel's Report, May*, **1905,** 84.) The oil distilled at Amani from the fruit of this East African Zingiberaceous plant is brownish yellow in colour and closely resembles oil of cardamoms. B.p. (under 7 Mm.) 51° to 100°C. : sp. gr. 0·9016 at 15°C. ; $[\alpha]_D$ - 10° 54′ ; acid value, 3·5 ; ester value, 1·7 ; acetyl value, 67·05 ; solubility in 80 per cent. alcohol 1 : 1 to 1 : 1·5 with turbidity. It contains much cineol.

Amorpha fructuosa, Essential Oil of. V. Pavesi. (*Estrat. dall' Ann. della Soc. Chim. di Milano*, through *Schimmel's Report, Oct.*, **1904,** 9.) *Essential Oil of the leaves.* When freshly distilled this has the $[\eta]_D$ 1.590928 · and $[\eta]_D$ 1.50892 at 18·5°C. on keeping. The yield is 0·5 to 0·8 per cent. of a bright yellow bitter oil. The portion boiling between 150°–220°C. under 750 Mm. pressure contains an unidentified terpene ; cadinene was isolated from the fraction boiling between 250°–265°C., as well as a sesquiterpene resembling clovene, for which the name amorphene is suggested.

Essential Oil of the Fruit. The yield is 1·5 to 3·5 per cent. That from immature fruit has the sp. gr. 0·9019 ; $[\eta]_D$ at 17·5°C., 1,49951 ; the ripe fruits yield an oil with the sp. gr. 0·9055 and the $[\eta]_D$ at 17·5° C., 1,50036. Both are feebly lævorotatory.

Amount of Neon and Helium in the Atmosphere. W. Ramsay. (*Chem. News*, **91,** 203.) The method of absorbing gases by means of cooled coconut charcoal discovered by Dewar has enabled the author to determine the amounts of neon and helium in the atmosphere ; since, although the other atmospheric gases are readily absorbed by the cold charcoal at −100°C., neon and helium are not appreciably occluded. The required temperature of the charcoal was obtained by means of solid ether. After removing the remaining traces of oxygen and nitrogen in the residual gases by sparking, they were again treated with charcoal cooled with liquid air. At this temperature, most of the neon is absorbed, leaving only helium in the gaseous state. It is estimated from these experiments that the proportion of neon in the atmosphere is 1 in 80,790, and of helium 1 in 245,300 by volume.

Anethol, Polymerization of, by keeping exposed to Light and Air. (*Schimmel's Report, October*, **1904,** 42.) When anethol and the essential oils containing it are kept for a long period exposed to the action of light and air, the anethol becomes polymerized, losing its crystallizing power, and greatly increasing in density. Thus, a specimen of anethol which originally had the sp. gr. 0·9846 at 25°C., $[\eta]_D$ 1,56079, solidifying point 21·3°C., solubility in alcohol 90 per cent. 1 : 2, after keeping exposed for two years had the sp. gr. 1·1245 at 25°C., $[\eta]_D$ 1,54906 ; not solid at -20°C., soluble in 70 per cent. alcohol 1 : 2 and more. The optical inactivity remained unaffected. The changed oil had acquired a yellow colour, and was less mobile than normal anethol ; its taste was quite altered, being bitter and disagreeable. It contained anisic aldehyde but no anisic acid. A similar increase in sp. gr. has been observed in improperly kept fennel oil.

Aniline Colours and Salicylic Acid, Detection of, in Foods. C. H. La Wall. (*Amer. Journ. Pharm.*, **76,** 477.) Liquids are diluted with an equal quantity of water ; solids dissolved in four times their weight of water. About 100 c.c. of the solution is acidified with 4 c.c. of HCl and boiled for 5 minutes with a shred fat-free cotton wool. The wool is then withdrawn, washed, and boiled for 5 minutes in water acidified with HCl. If no foreign colour be present, the wool will be either colourless or merely tinted faintly red or brownish; with aniline dyes present it is distinctly coloured. If it be now well washed, then treated with a little ammonia, any vegetable colour is not dissolved but is changed in tint ; aniline colours do not change in shade but are soluble, especially when the solution is warmed, and after acidifying the solution with HCl another piece of wool may be dyed with it.

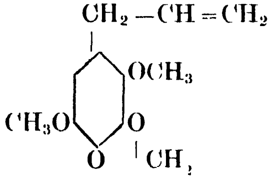
To detect salicylic acid, the solution of the substance is acidified with H_2SO_4 and shaken out with ether. On evaporating a portion of the ethereal extract, the residue will give the characteristic reaction with Fe_2Cl_6. Any tannin present must first be removed from the original solution by treatment with lead acetate.

Antipyrine, Determination of, by means of Picric Acid. P. Lemaire. (*Bull. Soc. Pharm. de Bordeaux*, through *Reper-*

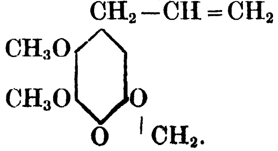
toire [3], **16,** 493.) Advantage is taken of the fact that antipyrine combines with picric acid, molecule for molecule, and that the picrate formed is insoluble in excess of the acid, although it is slightly soluble in water alone. A N/20 solution of picric acid is prepared by dissolving 11·45 Gm. in water, with heat, and making up to 1 litre. This is set against N/10 NaOH solution, using phenolphthalein indicator. A 5 per cent. solution of the antipyrine to be tested is made ; 5 c.c. of this, corresponding to 0·25 Gm., is taken, well shaken up with 50 c.c. of the N/20 picric acid solution, and filtered. Twenty-five c.c. of the filtrate is then measured off and the excess of free picric acid titrated with N/10 NaOH and phenolphthalein indicator.

Each c.c. of N/20 picric acid used up is equivalent to 0·0094 Gm. of antipyrine. Therefore when η = the number of c.c. of N/10 NaOH required to neutralize the free acid, the amount of antipyrine in 1 Gm. of the substance taken $=(50-\eta\times 4{\cdot}4)\times 0{\cdot}0094\times 4$. The precipitated picrate formed should be collected, dried, and its m.p. taken, which should be 187°C. This will detect the presence of the more highly toxic iso-antipyrine, which has the same m.p. and general reactions of antipyrine, but the picrate of which melts at 168°C. An approximate determination of the antipyrine may be made colorimetrically with the above filtrate from the precipitated picrate comparing the tint thereof with that of a standard solution of picric acid.

Apiol, Dill- and Parsley-, Constitution of. H. Thoms. (*Archiv. der Pharm.*, **242,** 344.) The author has shown that parsley apiol is a (1) allyl- (2, 5) dimethoxy- (3, 4) methylenedioxybenzene.



while dill apiol is proved to be a (1) allyl- (5, 6) dimethoxy- (3, 4) methylenedioxybenzene,



Apricot-tree Gum, French. P. Lemeland. (*Journ. Pharm. Chim.* [6], **21, 443.**) French apricot gum is found to contain 16·1 to 16·5 per cent. of water, 2·85 per cent. of ash; galactanes equivalent to 19·8 per cent. of galactose; pentosanes equivalent to 40·75 per cent of arabinose. The aqueous solution of the gum, 76·614 per cent. of which was soluble in water, had the $\alpha_D - 1^\circ\ 93'$. The insoluble portion swelled up, giving a mucilage without viscosity and easily separated by filtration.

Arctium Lappa, Essential Oil of. (*Haensel's Report, July,* **1904,** through *Apoth. Zeit.*, **19,** 558, 854.) Burdock root yielded 0·176 per cent. of brownish-yellow fluid essential oil with an acid reaction; sp. gr. 0·9695 at 25°C.; $\alpha_D + 1{\cdot}24^\circ$ at 30°; acid value, 13·5; saponification value, 236·8. It is soluble in alcohol (80 per cent.).

Burdock leaves, air-dried, yielded 0·0285 per cent. of a dark brown oil, fluid at 30°C., having the sp. gr. 0·9562 at 20°C.; acid value, 76; saponification value, 91·5. The oil has a similar odour to that distilled from burdock root. On rectifying only 39 per cent. of the crude oil is distilled. The rectified oil is faintly acid in reaction; freely soluble in alcohol (96 per cent.); the solution in 80 per cent. alcohol is slightly cloudy; sp. gr. 0·9407 at 20°C., acid value, 18; saponification value, 70; $[\alpha_D] + 0{\cdot}28^\circ$ in 20 per cent. alcoholic solution.

Aristol, Adulterated. — Waldmann. (*Apoth. Zeit.*, **19,** 422.) A low priced Swiss aristol has been met with containing only 50 per cent. of dithymol di-iodide; the other 50 per cent. consisting of 30 per cent. of salts soluble in water, calcium chloride and iodide, and 20 per cent. of insoluble matter, chiefly calcium carbonate. Another Swiss sample consisted of 15 per cent. of aristol and 85 per cent. of red argillaceous earth. A German specimen was found to contain 30 per cent. of aristol, 13 per cent. of water and soluble impurities, and 57 per cent. of insoluble added matter.

Aromatic Compounds, Differentiation of Allyl and Propenyl Groups. G. Bruni and E. Tornani. (*Alti R. Accad. del Linc. Rom.* through *Schimmel's Report. May,* **1905,** 86.) Aromatic bodies containing an allyl group in the side-chain, such as methyleugenol, safrol, or dill apiol, do not combine with picric acid. Those containing a propenyl group, however, give definite picrocompounds when their ether or benzol solutions are mixed. The picrate of methyl iso-eugenol, $C_{17}H_{17}O_9N_3$ thus obtained has the m.p. 40–45° ; asarone picrate $C_{18}H_{19}D_7N_3$ m.p. 81–82°C. ; isosafrol picrate $C_{16}N_{13}O_9N_3$ m.p. 73° ; isoapiol picrate $C_{18}H_{17}O_{11}$ N_3 m.p. 81°C.

Arrow Poison of the Lukarets of the Lado Territory. A Sapin. (*Journ. Pharm. Chim.* [6], **21,** 397.) The fresh juice of a plant with which the Lukarets poison their arrows is found to be the roughly-prepared gum resin of a *Euphorbium.* It gives 47 per cent. of resin soluble in chloroform ; the insoluble residue consists of vegetable matter and earthy impurity. In general characters the chloroform extract is identical with those of euphorbium gum

Arsenic, Detection of, in Official Drugs. W. R. Dunstan and H. H. Robinson. (*Report presented to the Pharmacopœia Committee of the General Medical Council, May,* **1904,** *published September,* **1904.**) As most convenient and suitable for general use, the Mayençon and Bergeret test (generally known as Gutzeit's test) has been adopted, with modifications for the detection of arsenium in drugs. The standard for reference is given in terms of arsenium (As.), and as a general rule 3 parts per million is taken as the limit for those drugs which are given in small doses. In addition to those which are at present required to give no characteristic reaction for arsenium, the following are recommended to be added —

Acidum Boricum, Acidum Citricum, Acidum Salicylicum, Alumen, Ammonii Bromidum, Ammonii Carbonas, Calcii Carbonas Præcipitatus, Calcii Chloridum, Calcii Hydras, Calx, Ferri Sulphas, Ferrum, Ferrum Redactum, Gelatinum, Glusidum, Iodum, Liquor Hydrogenii Peroxidi, Magnesia Levis, Magnesia Ponderosa, Magnesii Carbonas Levis, Magnesii Carbonas Ponderosus, Magnesii Sulphas, Phenacetinum, Phenazonum, Potassii Carbonas, Potassii Chloras, Potassii Citras, Potassii Tartras, Potassii Tartras Acidus, Quininæ Hydrochloridum, Quininæ Hydrochloridum Acidum, Quininæ Sulphas, Sapo Animalis, Sapo Durus, Soda Tartarata, Sodii Bicarbonas, Sodii Carbonas, Sodii Hypophosphis, Sodii Phosphas, Sodii Sulphas, Sulphonal, Sulphur Precipitatum, Sulphur Sublimatum, Syrupus Glucosi.

The tests for arsenium described on pp. 418 and 419 of the

British Pharmacopœia, 1898, should be omitted, and the following should replace them :—

Those drugs which are directed to yield no characteristic reaction for arsenium should be proved to contain less than three parts of arsenium in one million parts of the drug (three parts of arsenium are equivalent to four parts of arsenious anhydride), except in the cases of *Acidum Citricum* and *Acidum Tartaricum*, which should be proved to contain less than one part in one million ; and in the cases of *Acidum Hydrochloricum*, *Acidum Nitricum*, and *Acidum Sulphuricum*, which should be proved to contain less than 0·3 part per million ; and in the case of *Liquor Ammoniæ Fortis*, which should be proved to contain less than 0·1 part per million.

The freedom of the drug from these quantities of arsenium is to be proved by comparing the stain it yields, when submitted to one of the following tests suited to its nature, with the stain yielded by *Liquor Arsenici Hydrochloricus* suitably diluted and submitted to the same test.

Each reagent employed must contain less arsenium than the limit prescribed for it ; allowance can be made, on the one hand, for an increase in the stain due to any minute quantities of arsenium (below these limits) contained in the reagents, and, on the other hand, for any diminution in the stain due to the process, by employing the same reagents in a similar manner when preparing the stain used as a standard for comparison.

The following are the tests proposed :—

Test A.—An aqueous solution of 4 Gm. or the prescribed quantity, of the drug to which 5 c.c. or more of HCl have been added, is diluted to 25 c.c. with water and introduced into a test-tube having a diameter of about 18 Mm. and a length of 18 to 20 Cm. Granulated zinc, sufficient to reach about two-thirds of the height of the liquid is then added. Immediately a small plug of cotton wool, and then another plug of cotton wool which has been soaked in lead acetate solution and dried, are inserted, so as to leave a short space between the two plugs ; a closely fitting cap formed of two pieces of filter-paper which have been soaked in $HgCl_2$ solution and dried is then fitted over the mouth of the test tube. The test must be allowed to continue for 2 hours at least ; the test paper is then examined, in daylight, for a yellow stain. The test should be performed in a place protected from strong light. Ten c.c. of the *Liquor Arsenici Hydrochloricus* are diluted to 75 c.c. when 1 c.c. of the solution contains 0·001 Gm. of arsenium. Four c.c. of this solution diluted to 1000 c.c. afford the standard solution, each c.c. of which contains 0·004 Mgm. of arsenium, and is equivalent, for purposes of comparison, with 4 Gm. of the drug, to 1 part per 1,000,000. Therefore the yellow stain from 4 Gm. of the drug should be paler than the yellow stain from 3 c.c. of this solution mixed with water and with 5 c.c. or a suitable quantity of hydrochloric acid diluted to 25 c.c. and tested in a similar manner and at the same time. The dilute arsenical standard solution should be freshly prepared.

When the drug cannot be conveniently dissolved in 25 c.c. of liquid, or when frothing occurs, the test may be conducted in a small flask, the stain being compared with the standard stain obtained under similar conditions.

The yellow stain due to sulphur is soluble in less than 10 minutes in a few c.c. of hydrochloric acid, whereas that due to arsenium changes to an orange colour and persists for 1 or 2 hours. The zinc employed should first be washed for a few seconds with hydrochloric acid, and then with water, shortly before use, to remove any adherent sulphur compounds.

Test B.—Four Gm. of the drug are introduced into a 60 c.c. distillation flask, with 2 Gm. of potassium metasulphite and 22 c.c. of a mixture of hydrochloric acid and water in such proportions that, after reaction, "there shall be hydrochloric acid solution approximately of the constant boiling strength, that is, 20 parts of free hydrochloric acid to 80 parts of water." The flask is then attached to a condenser, the internal tube of which should not exceed 8 Mm. in diameter, and heated gently for 1 hour, to reduce any arsenic compounds. It is then distilled until three-fourths have passed over; the distillate is partially neutralized with strong solution of ammonia, so as to leave unsaturated about 4 c.c. of the 20 per cent. hydrochloric acid (1 c.c. of strong solution of ammonia neutralizes 2·8 c.c. of 20 per cent. hydrochloric acid). Some distillates, especially those from antimony and bismuth compounds, effervesce with zinc more violently than the solutions of other substances, so that in these less than 4 c.c. of acid should be left unneutralized. The sulphur dioxide in the distillate is then removed by means of bromine solution [bromine 10 c.c., KBr 30 Gm., water to 100 c.c.] until the red colour is permanent on warming for a minute or two. Excess of bromine is then removed with solution of hydroxylamine hydrochloride 2 per cent. until the liquid is colourless. The liquid is then diluted to 25 c.c. with water, and the process completed as described under Test A. When effervescence has ceased, a further addition of hydrochloric acid should be made to ensure that all the arsenium has been evolved. The stain obtained is compared with that from 3 c.c. of the dilute standard solution submitted to the same process.

In the following cases slight modifications of procedure are recommended :—

Acidum Aceticum, Acidum Hydrobromicum Dilutum, Acidum Lacticum, Acidum Phosphoricum Concentratum, Alumen, Ammonii Bromidum, Ammonii Chloridum, Ammonii Phosphas, Calcii Chloridum, Glycerinum, Liquor Zinci Chloridi, Lithii Citras, Magnesii Sulphas, Phenazonum, Potassii Acetas, Potassii Bromidum, Potassii Citras, Potassii Tartras, Soda Tartarata, Sodii Bromidum, Sodii Sulphas, Zinci Acetas, Zinci Chloridum, Zinci Sulphas, Zinci Sulphocarbolas.

4 Gm. are dissolved in nearly 20 c.c. of water, and the solution is mixed with 5 c.c. or other suitable quantity of HCl, diluted to 25 c.c. with water, and tested as described in Test A.

Potassii Sulphas, Sodii Phosphas. 4 Gm. are dissolved in the smallest convenient quantity of water, and the solution is mixed with 5 c.c. or other suitable quantity of HCl, and tested in a small flask as described in Test A.

Potassii Iodidum, Sodii Iodidum. 4 Gm. are dissolved in 5 c.c. of water and are tested by Test A modified in the following manner : 5 c.c. or other suitable quantity of HCl are to be mixed with 14 c.c. of water in the test tube. The zinc is then added and the effervescence is allowed to proceed for 2 minutes, then the above solution of the iodide is poured in and the plugs and cap are at once put into position.

Syrupus Glucosi. 4 Gm. are dissolved in 10 c.c. of water. In order to oxidize any SO_2 that may be present, 3 c.c. of strong solution of bromine are added, and then 5 c.c. of HCl, and the mixture is warmed for a few minutes, care being taken to stop whilst a distinct amount of free bromine is still present. When cold the free bromine is removed by adding a little solution of hydroxylamine hydrochloride ; 3 c.c. or other suitable quantity of HCl are added, and the liquid is diluted to 25 c.c. with water and tested as described in Test A. In presence of glucose the stain obtained from 3 c.c. of the diluted *Liquor Arsenici Hydrochloricus* is only about three-fourths of its proper intensity, and for this diminution allowance must be made by means of a comparative experiment made with the *Syrupus Glucosi* and the arsenium solution. The effervescence should be prolonged by a second addition of HCl.

Acidum Boricum, Borax. 4 Gm. are mixed with 8 Gm. of citric acid and dissolved in 55 c.c. of water, and the solution is mixed with 5 c.c. or other suitable quantity of HCl, and tested in a small flask as described in Test A.

Acidum Citricum, Acidum Tartaricum. 12 Gm. are dissolved in 40 c.c. of water, and the solution is mixed with 15 c.c. or other suitable quantity of HCl, and tested in a small flask as described in Test A. The stain should be less than that given by 3 c.c. of the diluted *Liquor Arsenici Hydrochloricus* similarly treated, thus proving that the drugs contain less than 1 part of arsenium in one million parts of the drug.

Acidum Hydrochloricum. 40 Gm., or 34·5 c.c., are placed in a porcelain basin and mixed with 2 c.c. of strong solution of bromine. The mixture is gently evaporated on a sand bath, an excess of bromine being maintained by addition of more solution as required. When the volume is reduced to about 15 c.c., the acid is partially neutralized with AmOH (1 c.c. of which = 2·8 c.c. of HCl), so as to leave unneutralized 5 c.c. or other suitable quantity of HCl solution of the constant boiling strength. The excess of bromine is removed by adding a little solution of hydroxylamine hydrochloride ; the liquid is then diluted to 25 c.c. with water, and tested by Test A. The stain should be less than that given by 3 c.c. of the diluted *Liquor Arsenici Hydrochloricus*, thus proving that the drug contains less than 0·3 part of arsenium in one million parts of the drug.

Acidum Nitricum. 40 Gm., or 28·2 c.c., are mixed with 2 c.c. of H_2SO_4 and with 0·1 Gm. of $NaHCO_3$, and the liquid is evaporated in a porcelain basin on a sand bath until all the HNO_3 is expelled and fumes of H_2SO_4 are given off. The residual liquid is cooled and mixed with about 15 c.c. of water, and then with 3 c.c. or other suitable quantity of HCl. The mixture is diluted to 25 c.c. with water, and tested by Test A. The stain should be less than that given by 3 c.c. of the diluted *Liquor Arsenici Hydrochloricus*, thus proving that the drug contains less than 0·3 part of arsenium in one million parts of the drug.

Acidum Sulphuricum. 40 Gm., or 21·7 c.c., are mixed with 5 c.c. of HNO_3 and with 0·1 Gm. of $NaHCO_3$, and evaporated in a porcelain basin on a sand bath until only about 2 c.c. remain. The residual liquid is cooled, and is then mixed with about 15 c.c.

of water, and then with 3 c.c. or other suitable quantity of HCl. The mixture is diluted to 25 c.c. with water, and tested by Test A. The stain should be less than that given by 3 c.c. of the diluted *Liquor Arsenici Hydrochloricus*, thus proving that the drug contains less than 0·3 part of arsenium in one million parts of the drug.

Liquor Ammoniæ Fortis. 120 Gm., or 135 c.c., are mixed with 0·1 Gm. of $NaHCO_3$, and the solution is evaporated to dryness, or nearly to dryness, on a water bath. The residue, when cold, is dissolved with a mixture of 5 c.c. or other suitable quantity of HCl, and about 20 c.c. of water, avoiding heating except for a minute or two. The solution is diluted to 25 c.c. with water, and tested by Test A. The stain should be less than that given by 3 c.c. of the diluted *Liquor Arsenici Hydrochloricus*, thus proving that the drug contains less than one-tenth of one part of arsenium in one million parts of the drug.

Ammonii Carbonas, Calcii Carbonas Præcipitatus, Calcii Hydras, Lithii Carbonas, Magnesia Levis, Magnesia Ponderosa, Magnesii Carbonas Levis, Magnesii Carbonas Ponderosus, Potassa Caustica, Potassii Bicarbonas, Calcii Phosphas, Calx, Liquor Potassæ, Potassii Carbonas, Potassii Tartras Acidus, Sodii Bicarbonas, Sodii Carbonas, Zinci Carbonas, Zinci Oxidum, Zinci Valerianas.

4 Gm. are dissolved in HCl and water, using enough HCl to acidify and dissolve the 4 Gm. of drug taken, and to produce a suitable effervescence with the zinc.

Care must be taken not to warm HCl and drug together except for a minute or two, and with only a small area of surface, so as to avoid loss of arsenium. If necessary, loss of arsenium can be avoided by adding a little strong solution of bromine with the HCl; when solution is effected the excess of bromine is removed by the addition of a little solution of hydroxylamine hydrochloride.

The solution is diluted if necessary and tested in a test tube or flask as described in Test A.

If a drug contains any iron, it must be tested as described in Test B.

Cerii Oxalas. 4 Gm. are added to a small flask containing a hot mixture of 15 c.c. of HCl, 10 c.c. of water, and 1 c.c. of strong solution of bromine. The mixture is heated for about a minute; as soon as solution has occurred the flask is removed from the flame and the acid is partially neutralized by the addition of about 7·25 c.c. of AmOH, and the free bromine is removed by the addition of a little strong solution of hydroxlyamine hydrochloride. The mixture is then tested in the flask as described in Test A, shaking it occasionally to promote the circulation of the liquid, which is checked by the presence of the precipitate.

Iodum. 4 Gm. are mixed with 0·1 Gm. of $NaHCO_3$, and then with 3 c.c. of water and 4 c.c. of H_2SO_4 in a porcelain basin, and the mixture is heated with stirring until all the iodine is driven off. The residue of H_2SO_4 is diluted with about 15 c.c. of water, and then mixed with 2 c.c. or other suitable quantity of HCl, and then diluted to 25 c.c. with water and tested as described in Test A.

Liquor Hydrogenii Peroxidi. 4 Gm. are mixed with 4 c.c. of water and with 2 c.c. of H_2SO_4. $KMnO_4$ is then added in small quantities at a time until the H_2O_2 is all decomposed and a slight permanent coloration is produced. The solution is mixed with 7 c.c. of water, and the coloration is destroyed by the addition of a little solution of hydroxylamine hydrochloride. 3 c.c. or other suitable quantity of HCl are to be added, and the solution is diluted to 25 c.c. with water, and tested as described in Test A.

Potassii Chloras. 6 c.c. of H_2SO_4 are mixed with 3 c.c. of water and the mixture is heated. 4 Gm. of the $KClO_3$ are added cautiously, in small portions at a time, to the above liquid whilst hot. When effervescence has ceased the liquid is evaporated in a porcelain basin until only about 2 c.c. is left. The residue is then dissolved in about 15 c.c. of water and mixed with 2 c.c. or other suitable quantity of HCl and diluted to 25 c.c. with water, and then tested by Test A.

Potassii Nitras. 4 Gm. are added to 4 c.c. of H_2SO_4 in a porcelain basin, and heated until all the HNO_3 is driven off and fumes of H_2SO_4 escape. The residue is then dissolved in about 15 c.c. of water, 3 c.c. or other suitable quantity of HCl are added, and the solution is diluted to 25 c.c. with water, and tested by Test A.

Potassii Permanganas. 4 Gm. are added in small quantities at a time to 30 c.c. of HCl. When dissolved, 2 c.c. of solution of hydroxylamine hydrochloride are added in order to decolorize the liquid, and then about 4 c c. of AmOH in order partially to neutralize the HCl. 1 c.c. of solution of hydroxylamine hydrochloride is then added to remove the last traces of free chlorine, and the liquid is tested in a flask by Test A.

Calcii Hypophosphis, Sodii Hypophosphis. A mixture of 12 c.c. of HNO_3 and 12 c.c. of water is warmed, and 4 Gm. of either salt added in small quantities at a time. When all is added, the liquid is evaporated to dryness on a sand bath and the residue gently heated until the HNO_3 has been driven off. When cold it is dissolved in 5 c.c. or other suitable quantity of HCl mixed with water, avoiding loss by warming, or using the bromine and hydroxylamine hydrochloride treatment. The solution is then diluted to 25 c.c. with water, and tested by Test A.

Phosphorus. 0·6 Gm. is dissolved by heating cautiously in a flask of about 100 c.c. capacity, having a small funnel placed in its mouth, with a mixture of 5 c.c. of HNO_3 and 5 c.c. of water. The solution is then transferred to a porcelain basin, and in order to oxidise any phosphorous acid 5 c.c. of HNO_3 are added, and the mixture is concentrated to about half its volume. To remove HNO_3 0·1 Gm. of $NaHCO_3$ is then added and 3 c.c. of H_2SO_4, and after mixing the liquid is evaporated to about 3 c.c., then cooled and mixed with 10 c.c. of water, evaporated until fumes of H_2SO_4 escape; when cold the residue is diluted with about 10 c.c. of water and mixed with 5 c.c. or other suitable quantity of HCl, diluted to a volume of 25 c.c. with water, and tested by Test A. The stain should be less than that given by 3 c.c. of the diluted *Liquor Arsenici Hydrochloricus,* thus proving that the drug contains less than 0·02 per cent. of arsenium.

Sulphur Præcipitatum, Sulphur Sublimatum. 4 Gm. are dissolved by heating them in a large flask having a small funnel placed in its mouth, with 25 c.c. of fuming nitric acid, and acid when necessary (about 60 or 70 c.c. will be required). When the sulphur has all dissolved, 0·1 Gm. of $NaHCO_3$ is added, and the liquid is evaporated in a porcelain basin on a sand bath until all HNO_3 is expelled and fumes of H_2SO_4 are given off, and the volume reduced to about 2 c.c.; it is then diluted with about 15 c.c. of water, mixed with 2 c.c. or other suitable quantity of HCl, diluted to a volume of 25 c.c. with water, and tested by Test A. The amount of arsenium in the fuming nitric acid used can be determined by the method described for *Acidum Nitricum* and allowed for. It should be less than 0·1 of arsenium in one million parts of the acid, and the acid should be free from the impurities mentioned in the case of *Acidum Nitricum,* especially iron.

Acidum Salicylicum, Adeps Lanæ, Glusidum, Phenacetinum, Sapo Animalis, Sapo Durus, Sulphonal.

4 Gm. are mixed with 2 Gm. of magnesia and 2 Gm. of

exsiccated sodium carbonate; the mixture is made into a thin paste by warming with a small quantity of water and stirring. This is then dried and ignited in a porcelain basin or in a porcelain crucible until the volatile organic matter is driven off and the residue is greyish white. The temperature must not approach a white heat. 15 c.c. of water are mixed with 21 c.c. of HCl and 3 c.c. of strong solution of bromine. The ignited residue is added to this mixture, previously cooled, in small portions at a time. When solution is effected (some carbonaaceous particles will remain undissolved) the excess of bromine is removed by adding a little solution of hydroxylamine hydrochloride, and the liquid is tested in a flask by Test A. The plug of plumbized cotton wool must be used, as the treatment with bromine does not altogether prevent the evolution of SH_2. For the purpose of obtaining a stain for comparison, 3 c.c. of the diluted *Liquor Arsenici Hydrochloricus* should be submitted to the same process.

Cupri Sulphas, Ferri Phosphas, Ferri Sulphas, Gelatinum, Plumbi Acetas, Quininæ Hydrochloridum, Quininæ Hydrochloridum Acidum, Quininæ Sulphas.

4 Gm. are tested as described in Test B.

Antimonii Oxidum, Antimonium Tartaratum. 4 Gm. are tested as described in Test B, but as the distillate will still contain a little antimony chloride, the condenser is washed, and the distillate is to be re-distilled until about three-fourths of it have collected in the receiver; this distillate is then treated as directed in Test B. With *Antimonii Oxidum,* 23 c.c. of HCl and no water are to be used, and a mixture of 20 c.c. of HCl and 3 c.c. of water with *Antimonium Tartaratum.*

Antimonium Nigrum Purificatum, Antimonium Sulphuratum. 0·4 Gm. are heated in a flask of about 100 c.c. capacity, having a small funnel placed in its mouth, with 10 c.c. of fuming HNO_3, until all sulphur or black sulphide has been oxidized. A white precipitate will be formed in the liquid, but the absence of free sulphur or of black sulphide can be easily seen. The mixture is then transferred to a porcelain basin, and mixed with 0·1 Gm. of $NaHCO_3$ and with 3 c.c. of H_2SO_4. All the HNO_3 is removed by evaporating down to about 3 c.c. and then mixing the residue when cold with 10 c.c. of water, and evaporating again until fumes of strong H_2SO_4 escape. When cold the residue is transferred to a flask of about 60 c.c. capacity, by means of a mixture of 15 c.c. of HCl and 7 c.c. of water. 2 Gm. of potassium metasulphite are added, and the flask is immediately attached to a condenser and treated as described in Test B, but as the distillate will still contain a little antimony chloride, the condenser is washed and the distillate is redistilled until about three-fourths of it have collected in the receiver; this distillate is treated as directed in Test B. The stain should be less than that given by 3 c.c. of the diluted *Liquor Arsenici Hydrochloricus*, thus proving that the drug contains less than 0·03 per cent. of arsenium.

Bismuthi Oxidum. 4 Gm. are tested as described in Test B, using 20 c.c. of HCl and 2 c.c. of water; but if the oxide contains any nitrate it must be tested in the same manner as *Bismuthi Carbonas.*

Bismuthi Carbonas, Bismuthi Subnitras. 4 Gm. are mixed with 5 c.c. of HNO_3 in order to oxidize any arsenious compounds to arsenic acid, and then with 8 c.c. of H_2SO_4, and heated in a porcelain basin on a sand bath until all the HNO_3 is expelled and a considerable proportion of the H_2SO_4 has been driven off in fumes. When evaporating off sulphuric acid, in order to avoid loss of arsenium, the latter should be present as arsenic acid and not as arsenious compounds. The residue is cooled, and then 6 c.c. of water are added. The mixture is again cooled, and is then to be transferred to a flask of about 60 c.c. capacity, together with 17 c.c. of HCl; 4 Gm. of $FeSO_4$ and 2 Gm. of potassium metasulphite are added, and the rest of the test is conducted as described in Test B.

Bismuthi Salicylas, Liquor Bismuthi et Ammonii Citratis. 4 Gm. are mixed with 2 Gm. of MgO and 2 Gm. of dried Na_2CO_3, and the mixture is made into a thin paste by warming with a small quantity of water. It is then dried and ignited in a porcelain basin or in a porcelain crucible until the volatile organic matter is driven off and the residue is greyish. 15 c.c. of water are mixed with 21 c.c. of HCl and 3 c.c. of strong solution of bromine in a flask of about 60 c.c. capacity. The ignited residue is added to this mixture, previously cooled, in small proportions at a time. When solution is effected (some carbonaceous particles will remain undissolved), the flask is attached to a condenser as described in Test B, and distilled until about half the volume of the liquid has passed over. This distillate will contain the free bromine and no arsenium; but for greater security it may be tested for arsenium. A fresh receiver is placed in position, and 20 c.c. of HCl are added to the residue in the distilling flask and then 2 Gm. of potassium metasulphite, and the mixture is heated gently for about one hour in order to reduce arsenic compounds. It is then distilled until about three-fourths of it have passed over, and the distillate is treated in the same manner as the distillate described in Test B, but as the volume will exceed 25 c.c., it must be tested in a small flask.

Ferrum. 4 Cgm. are dissolved in a mixture of 3 c.c. of HNO_3 and 3 c.c. of water, and evaporated to dryness in a small porcelain basin; the residue is ignited until the ferric nitrate is converted into ferric oxide. It is then transferred to a flask of about 60 c.c. capacity, together with 10 c.c. of HCl and 6·5 c.c. of water, scraping out as much as possible, and treating the remainder with the mixed acid and water, but not warming except very slightly and only for a minute or two. The flask is attached to a condenser, as described in Test B. The mixture is warmed until the Fe_2O_3 has all dissolved, and then 4 Gm. of $FeSO_4$ and 2 Gm. of potassium metasulphite and 7 c.c. of HCl are added, and the rest of the operation is conducted as described in Test B. At the end of the distillation the residue in the distilling flask should be tested, and some ferrous iron should be found to be present. The stain should be less than that given by 3 c.c. of the diluted *Liquor Arsenici Hydrochloricus*, thus proving that the drug contains less than 0·03 per cent. of arsenium.

Ferrum Redactum. 0·2 Gm. are heated in a flask having a small funnel placed in its mouth, with a mixture of 10 c.c. of HNO_3 and 10 c.c. of water. When action has ceased, if an insoluble residue is left, it is dissolved by adding 3 c.c. of HCl and continuing the warming. The solution is then transferred to a small porcelain basin, and 5 c.c. of HNO_3 are mixed with it; the liquid is then evaporated to dryness and ignited until the ferric nitrate is converted into Fe_2O_3. The ignited residue is then treated in the same way as the ignited residue obtained in testing *Ferrum*. The stain should be less than that given by 3 c.c. of the diluted *Liquor Arsenici Hydrochloricus,* thus proving that the drug contains less than 60 parts of arsenium in one million parts of the drug.

Liquor Ferri Acetatis. 4 Gm. are placed in a flask of about 60 c.c. capacity, together with 4 Gm. of $FeSO_4$. A mixture of 15 c.c. of HCl and 2 c.c. of water is added, and then 2 Gm. of potassium metasulphite. The flask is then attached to a condenser, and the mixture is treated as described in Test B. At the end of the distillation the residue in the distilling flask should be tested, and some ferrous iron should be found to be present.

Liquor Ferri Perchloridi Fortis. 0·25 Gm. are put in a flask of about 60 c.c. capacity, together with 4 Gm. of $FeSO_4$. A mixture of 15 c.c. of HCl and 6 c.c. of water is added, and then 2 Gm. of potassium metasulphite. The flask is then attached to a condenser, and the mixture is treated as described in Test B. At the end of the distillation, the residue in the distilling flask should be tested, and some ferrous iron should be found to be present. The stain should be less than that given by 3 c.c. of the diluted *Liquor Arsenici Hydrochloricus*, thus proving that the drug contains less than 48 parts of arsenium in one million parts of the drug.

Liquor Ferri Pernitratis. 1 Gm. is treated in the same manner as that described above for *Liquor Ferri Perchloridi Fortis.* The stain should be less than that given by 3 c.c. of the diluted *Liquor Arsenici Hydrochloricus*, thus proving that the drug contains less than 12 parts of arsenium in one million parts of the drug.

Arsenic, Detection of. F. C. J. Bird (*Pharm. Journ.* [4], **19,** 424), commenting on the preceding Report, notes that Dunstan and Robinson have taken the proportion of arsenium as their standard of arsenical impurity. It has been, up to the present, more generally the custom to express the arsenic in terms of arsenious oxide. It is considered desirable to continue the practice in order to avoid confusion.

The method of fastening on the cap of mercurialized paper is left open to the judgment of the operator. The author's experience indicates that it should be tied tightly over the mouth of the test-tube or flask, so that the evolved gas is obliged to force its way through the pores of the mercurialized paper.

With regard to the intensity of the stain, it is remarked that it is diminished by dampness. This should be emphasized, for a given stain, having naturally absorbed moisture by contact with the evolved gas charged with aqueous vapour, will often nearly double its depth of colour on exposure to the temperature of a water oven for a minute or two. It would, therefore, appear to be a desirable addition to the directions that the stain from the material under examination and that from the standard arsenical solution, for comparison, should be placed in a water oven for a few minutes, in order to ensure equal conditions and guard against a stain being damper, and, therefore, misleadingly fainter than the other. Drying in a water oven will also sometimes render evident a stain otherwise indistinguishable.

The use of plumbized cotton wool as a means of arresting sulphuretted hydrogen is, if the yellow colour of the stain is the only factor to be relied upon, open to some risk. It is difficult to control the evolution of gas in a test-tube, and a too-powerful rush is quite likely to drive traces of sulphuretted hydrogen past the plumbized wool, and so increase the apparent intensity of the stain. Solution of lead acetate is distinctly preferable.

The orange colour produced by treatment of an arsenical stain by HCl affords a valuable confirmation of the presence of arsenic, but it is not properly developed in the cold. For example, the yellow stain from 3 c.c. of the dilute solution of arsenium recommended by the authors (equivalent to 12/1000 Mgm. of arsenium), treated with a few c.c. of pure HCl in the cold became, after some time, of a moderately deep orange-yellow colour, which did not increase in intensity. A similar stain placed in a watch glass with a few c.c. of pure HCl (free from chlorine) and heated on sheet asbestos over a Bunsen burner until the acid just boiled, changed *at once* to the characteristic deep brick-red colour indicative of arsenium, and possessed nearly double the intensity of the similar stain which had been treated with HCl in the cold. Any yellow colour due to possible traces of SH_2 would, by the action of boiling HCl, disappear, whilst that due to arsenic would be intensified and changed to a characteristic tint. Rather, therefore, than rely on the yellow stain alone, which may be deceptive from traces of SH_2 or PH_3, it would be preferable to carry the test a step further, and make a comparison of the stains after treatment with pure HCl at a boiling temperature. There must be no uncertainty about the future B.P. tests for arsenic, and the acceptance of the indications of the yellow stain alone appears to admit the possibility of error.

The limits of arsenical impurity suggested by the authors will doubtless call forth a good deal of criticism. Generally they seem reasonable, excepting in the case of the mineral acids and ammonia, the limits for which, in view of their use in medicinal doses, appear unnecessarily stringent. Granting that these acids are used in the preparation of other substances, the absence of more than the limit of arsenic in the finished products is sufficiently guarded against by the respective tests, and the acids themselves should be considered merely in relation to their medicinal use.

Arsenic, Detection of, in Official Drugs. D. L. Howard. (*Pharm. Journ.* [4], **19,** 417.) It is contended that the standard for mineral acids required by Dunstan and Robinson is wholly unreasonable and utterly unnecessary for acids intended for ordinary work, and the only results of such fancy standards will be to cause them to be entirely ignored. Even one part of arsenic in a million parts of nitric acid can by no conceivable chance do any harm in medicine; and it is questioned whether it is criminal to lack the skill to discover such a proportion as one part in three millions. Then, again, it is almost impossible to find glass bottles that do not contain enough arsenic to contaminate perfectly pure acids to that extent. With regard to the method proposed for arsenic testing, the opinion is expressed that the Marsh-Berzelius test is very superior to that proposed.

Arsenic, Detection of, in Official Drugs. E. W. Mann. (*Pharm. Journ.* [4], **19,** 806.) The opinion is expressed that the standard suggested by Dunstan and Robinson for the greater part of the B.P. chemicals, three per million, is one that is commercially obtainable. There are a few instances where the proposed standard is more rigid.

In the case of the three mineral acids, HCl, H_2SO_4 and HNO_3, alone do the requirements that they should contain less than 0·3 of arsenium per million seem too stringent. It is a difficult matter to obtain acids of such purity, and any reasonable need would be met by the practicable standard of one per million. Much adverse criticism has been passed upon the question of *Ferrum redactum.* The standard proposed was admittedly one which a large proportion of the *Ferrum redact.* on the market at the time of publication failed to attain. A reduced iron containing less than 100 parts per million is now easily obtainable. The tests suggested in Dunstan and Robinson's report are considered to be well adapted for pharmaceutical use, and the standards fixed do not appear to be too stringent, with one or two exceptions.

Arsenic, Detection of, in Official Drugs. W. A. H. Naylor and E. J. Chappel. (*Pharm. Journ.* [4], **20,** 33.) The elaborate report of Dunstan and Robinson on the official tests for arsenium deserves the most careful attention of pharmacists and others who are engaged in the examination of drugs.

Test A commends itself on account of its simplicity, and the readiness with which it can be applied. By it the authors have detected 0·004 Mgm. of arsenium in 4 Gm. of a drug, equivalent to one part per million. The test will be generally acknowledged as sufficiently sensitive for ordinary pharmaceutical testing. It would be simplified by substituting for the test-tube a graduated tube of the same dimensions. By comparison Test B is not so simple, but for its execution no elaborate apparatus is required, and, assuming that the Gutzeit test be selected as the official one, it is not easy to conceive how it could be applied by means of a less complex apparatus. The authors agree with Bird that further investigations may lessen the number of drugs to which Test B is directed to be applied, probably by the substitution of some other of sufficient delicacy.

Among special tests recommended for particular drugs, attention is called to the monograph dealing with sublimed and precipitated sulphur. The analyst is directed to heat the sulphur in a large flask with fuming HNO_3. In performing this test, action not infrequently begins in the cold, and proceeds vigorously, thereby necessitating an inconveniently large flask. It is advisable that attention be called to this point, or that the mixture be directed to be heated after the action in the cold has subsided. With regard to the limits of arsenium suggested for final adoption, considerable diversity of opinion exists. In the main, the opinions expressed are to the effect that the limits are too stringent, although the results of the examination of a large number of drugs by Mann show that in many cases they are obtainable.

If the drugs contain only traces of sulphur, the plugs of plumbized cotton wool recommended in the Report act as an efficient absorbent of hydrogen sulphide. The statement that the plumbized wool can only be relied on to remove traces of sulphur, and, that where more exists, the drugs should be first subjected to the bromine and hydroxylamine hydrochloride treatment, is confirmed by the author's experiments. If the sulphur is carefully oxidized as described, only the lower portion of the plug, if it be a fair size, will be darkened.

If the amount of sulphur is comparatively large, recourse should be had to the triple bulb apparatus as recommended by other experimenters. Further, the statement is confirmed that the bromine and hydroxylamine treatment does not completely prevent the evolution of SH_2, but the quantity of sulphur left unoxidized is scarcely a measurable quantity. The results obtained with a number of samples are summarized as follows :-

Drugs which gave no perceptible Stain. Acetic acid, ammonium bromide, ammonium carbonate, ammonium phosphate, boric acid, calcium chloride, calcium hydrate, calcium phosphate, ferrous sulphate, lactic acid, lime, lithium carbonate, lithium citrate, magnesia calcined light, magnesia calcined heavy, magnesium sulphate, nitric acid (1·5), phenacetin, phenazone, potassium bicarbonate, potassium citrate, potassium hydrate, potassium iodide, potassium sodium tartrate, potassium tartrate, potassium tartrate acid, potassium permanganate quinine hydrochloride acid, sodium bicarbonate, sodium carbonate, sodium iodide, sodium phosphate, sodium sulphate, solution of hydrogen peroxide, solution of zinc chloride, zinc acetate, zinc sulphocarbolate, zinc oxide.

Drugs which contain Arsenium but readily pass the Proposed Limits. Alum, ammonium chloride, bismuth oxide, bismuth subnitrate, calcium carbonate precipitated, calcium hypophosphite, cerium oxalate, citric acid, copper sulphate, glycerin, dilute hydrobromic acid, hydrochloric acid, iron phosphate, heavy magnesium carbonate, light magnesium carbonate nitric acid, concentrated phosphoric acid, potassium bromide, potassium iodide, potassium metasulphite, potassium nitrate, potassium sulphate, quinine hydrochloride, reduced iron, saccharin, soap (hard), sodium bromide, sulphurated antimony, sulphuric acid, sulphur sublimed, sulphur precipitated, sodium hypophosphite, syrup of glucose, wool fat, zinc carbonate, zinc chloride, zinc sulphate. zinc valerianate.

Drugs which Approximate to or contain the Full Amount of Arsenium allowed by the Proposed Limits. Borax, bismuth salicylate, iodine, lead acetate, potassium acetate, quinine sulphate, soap (animal) solution of ferric nitrate, strong solution of ammonia, solution of ferric acetate, solution of ferric chloride, solution of potash.

Drugs which contain more Arsenium than the Proposed Limits allow. Parts of Arsenium per million, antimony oxide, 1,000, bismuth carbonate, 5 ; glycerin, 4 ; iron, 500 ; potassium carbonate, 4 ; reduced iron, 100 ; sulphonal, 6 ; tartarated antimony, 500.

An inspection of the above results shows that a large proportion of the articles pass the prescribed limits with ease. It would not, however, be just to infer in respect of those which exceed the assigned limit that they are not commercially obtainable on demand, since at the time of their purchase freedom from arsenic was not specified.

The inference to be drawn from a consideration of the results here recorded is that the recommendations as to arsenic limit, in the majority of drugs, are capable of practical fulfilment. A limit of three parts per million in antimony oxide is considered to be too stringent. Having regard to the small dose of the oxide (1 to 2 grains), a limit of 300 parts per million, the proportion recommended by Dunstan and Robinson for black and sulphurated antimony respectively, is advocated. For reduced iron the limit of 100 parts per million is put forward, although at the present time it is not difficult to obtain it containing not more than 60 parts per million. After making allowance for the large dose in which sulphonal is frequently administered, 6 parts of arsenium per million cannot be considered other than a negligible quantity. The authors concur in thinking that the arsenic limit for mineral acids might well be fixed at 1 per million, nor should strong solution of ammonia be required to conform to a higher standard.

Arsenic, Determination of, in Minute Quantity. R. C. Cowley and J. P. Catford. (*Pharm. Journ.* [4], **19**, 897.) The following modification of Remsen's method for the isolation of minute quantities of arsenic is described.

A few inches of fine copper wire, coiled into a helix by twisting it around a glass tube, is immersed in 10 c.c. of the liquid to be tested, to which one-fifth of its volume of pure HCl has been added. The liquid and acid are contained in a test tube, which is supported upright in a brine bath by means of a loop of wire resting on the edges of the bath. The coil of copper wire is arranged so that it shall reach from the bottom of the arsenical liquid to above its surface. The test-tube must be immersed in the brine bath so that the liquid it contains shall be below the level of the liquid in the bath; the bath is to be kept simmering without, however, reaching the boiling point, for about an hour. The projecting extremity of the copper is now to be pressed down below the surface of the liquid, and if it remains bright after continuing the application of heat for another fifteen minutes the arsenic will be all removed from the liquid, and the wire may be removed to a small dish, rinsed without touching it with the fingers, and the deposit then dissolved off by a cubic centimetre of bromine water containing a little hydrobromic acid. The clean wire is lifted out, rinsed with water, and if thought necessary may be returned to the acid liquid to make sure that all the arsenic has been deposited from it. The bromine solution now contains the arsenic as arsenious acid. To it 1 c.c. of solution of potash is added, and the liquid is boiled until the light green copper compounds are broken up. An aliquot part of the filtrate may be reserved and tested for arsenic acid by the molybdate reagent after evaporation; the remainder is reduced again to arsenite and titrated with N/100, or other suitably weak solution of iodine. A solution of iodine of convenient strength is made by diluting 10 c.c. of N/10 solution to about 150 c.c., and comparing it with a standard arsenical solution.

For a burette a pipette graduated in hundredths of a cubic centimetre is used. To control the flow, a piece of rubber tubing is slipped on the upper end and compressed by a screw clamp. One-hundredth part of a c.c. of the iodine solution gives a blue colour, with starch, in a volume of liquid not exceeding 10 c.c.

Arsenic in Hydrogen Peroxide Solution. L. Grimbert. (*Journ. Pharm. Chim.* [6], **21,** 385.) A specimen of commercial hydrogen peroxide solution is reported on which contained arsenic equivalent to 0·56 Gm. of sodium arsenate per litre. Although no previous published record of this impurity has appeared, its occurrence is not unknown, samples of arsenical hydrogen peroxide having been met with among those submitted to analysis at the central pharmacy of the French Military hospitals.

Arsenic in Reduced Iron, Detection of and Limit for. C. A. Hill and J. C. Umney. (*Pharm. Journ.* [4], **19,** 500.) For the accurate determination of arsenic in reduced iron use may be made of both the German Pharmacopœia and Dunstan and Robinson's recommendations. The following process based thereon is recommended:—

To 0·1 Gm. of the reduced iron are added 0·1 Gm. potassium chlorate and 1 c.c. of hydrochloric acid, the mixture being warmed until the chlorine, etc., has been dispelled. Eleven c.c. hydrochloric acid, 7 c.c. of water, 2 Gm. potassium metabisulphite, and 4 Gm. ferrous sulphate are next added, and the whole is heated on a water-bath under a reflux condenser for one hour.

The liquid is then distilled, 17 c.c. of distillate being collected, and to the latter bromine is added until the coloration is distinct and permanent. Lastly, the liquid is decolorized with a solution of hydroxylamine hydrochloride, and it now contains the arsenic as arsenious acid. The amount of arsenic is of course determined in the usual way, either by a suitable modification of the "Gutzeit" test or, if the case be one of importance, by the Marsh-Berzelius method.

Opinion is expressed that the limit suggested for arsenic in reduced iron by Dunstan and Robinson, 60 parts per million, is not a practicable one.

Arsenic in Sodium Phosphate. E. Bonjean. (*Rev. Intern. falsific* **17,** 171, through *Chem. Centralb.*, **76,** 1274.) Of 100 samples of medicinal sodium phosphate examined for the presence of arsenic, 16 were entirely free from arsenic, 41 contained about 1 Mgm. in 100 Gm.; 22, 1 to 5 Mgm.; 9, 5 to 10 Mgm.; 6, 10 to 15 Mgm.; and 5, 30 to 52 Mgm.

Arsenic, New Method of Separation. H. Cantoni and J. Chauterus. (*Annales de Chim. Analyt.*, **10,** 213.) Advantage is taken of the volatility of methyl arsenious ether at ordinary temperatures to eliminate arsenic from a mixture.

A solution of As_2O_3 in HCl is treated in a distilling flask with pure methyl alcohol. The delivery tube of the flask is connected to a condenser the other extremity of which, drawn out and bent, dips beneath the surface of a tubulated Erlenmeyer flask, connected with a pump. The cork closing the distilling flask, carries a long tube, which dips well below the surface of the methyl alcohol, in such a manner that when the connexion to the pump is made, air is aspirated through the liquid and the arsenic carried over into the alkaline liquid. After allowing the current of air to run for some time, at normal temperatures, the whole of the arsenic is found to be removed from the liquid in the flask. Since there is no boiling, no trace of impurity is carried over mechanically. A similar experiment performed with antimony proved that no volatilization of that metal took place under these conditions. The further application of the method is being investigated.

Artemisia annua, Essential Oil of. (*Schimmel's Report, May,* **1905,** 85.) The herb cultivated at Miltitz yielded 0·29 per cent.

of a lemon-yellow essential oil with a pleasant odour resembling that of sweet basil. The sp. gr. was 0·8912 at 15°C. $[\alpha]_D -1° 18'$; acid number, 3·8 ; ester number, 19·2 ; acetyl number, 44·5 ; solubility in alcohol, 80 per cent. 1 : 1 to 1 · 1·5, with turbidity on adding more acid to separation of paraffin.

Artemisia herba alba, Essential Oil of. E. Grimal. (*Bull. Soc. Chim.* [3], **32,** 694.) The herb, which is widely distributed in Algeria, yields 0·3 per cent. of a very fragrant greenish yellow oil ; sp. gr. 0·9456 ; $[\eta]_D$ 20° 1,47274 ; $[\alpha]_D$ 20° − 15° 38′ ; acid value, 6·46 ; ester value, 89·32, equivalent to 31 per cent of acetyl ester of the alcohol $C_{18}H_{18}O$. Acetyl value 135·38 equal to 12·65 of free alcohol. The oil is readily soluble, 1 : 2 to 1 2·5 of alcohol 70 per cent. ; it does not congeal at −12°C. A small quantity of an unidentified alcohol is present in the higher boiling fractions ; the lower fractions contain lævocamphene, cineol and camphor. Caprinic or caprylic acids are present as esters.

Backhousia citriodora, Essential Oil of. (*Schimmel's Report May*, **1905,** 83.) This yellow oil, derived from the Myrtaceous Australian plant, has a very fine lemon grass aroma Sp. gr 0·8972 at 15°C. ; optically inactive ; aldehyde content 95 per cent., probably all citral ; solubility 1 1 8 or more in alcohol 70 per cent.

Backhousia citriodora, of Queensland, Essential Oil of. (*Bullet Imper. Instit.*, **3,** 11.) The oil of *Backhousia citriodora*, distilled in Queensland, was greenish yellow and had a strong odour of citral. It was soluble in all proportions in alcohol 80 per cent., and 1 : 2·25 in alcohol 70 per cent. ; sp. gr. at 21 C. 0·8903 ; optically inactive ; $[\eta]_D$ 22° 1·4940. Citral by bisulphate method 93·5 per cent. This yield of citral is greater than any recorded from an essential oil ; consequently the oil should be worth distilling locally to compete with East Indian lemon-grass oil, for which there is a considerable demand.

Baobab Kernels. — Balland. (*Journ. Pharm. Chim.* [6], **20,** 529.) Baobab seeds yield 63·3 per cent. of kernels which have the following percentage composition. Water, 5·4 ; albuminoids, 17 ; fat, 63·2 ; extractive, 9·72 ; cellulose, 1·05 ; ash, 3·55 ; and P_2O_5 1·34 per cent. The extractive contains no starch. The fat is solid at normal temperatures, forming a whitish mass: it begins to soften at 25°C., and is fluid at 34°C., when it resembles olive oil in appearance; its odour is pleasant and taste bland; it does not readily become rancid.

Barbaloin, Constitution of. H. A. D. Jowett and C. E. E. Potter. (*Proc. Chem. Soc.*, **21,** 181.) The authors are unable to agree with the formula for barbaloin, $C_{21}H_{20}O_9$, or the structure of its molecule as suggested by Léger [*Year Book*, **1903,** 28], nor can they confirm that author's statements respecting the decomposition of barbaloin by Na_2O_2. The results of their investigations tend to prove the correctness of Tilden's formula, $C_{16}H_{18}O_7$ [*Year Book*, **1875,** 545]. *Tetra-acetyl-tribromobarbaloin*, $C_{24}H_{23}O_{11}Br_3$, was obtained in well-defined yellow needles, m.p. 135°C. Tribromobarbaloin, and probably barbaloin also, therefore contains four hydroxyl groups.

Barium Chloride, Volumetric Determination of. F. H. Alcock. (*Pharm. Journ.* [4], **19,** 173.) Pure Na_2SO_4 is added in slight excess to the solution of $BaCl_2$ to be examined; the amount of NaCl is then titrated in the usual manner, with N/10 $AgNO_3$ solution and K_2CrO_4 as indicator. The precipitated $BaSO_4$ need not be removed since it in no way interferes with the reaction.

Beeswax, Detection of Adulteration of, by Examination of the Colouring Matter. P. Lemaire. (*Bull. Soc. Pharm. de Bordeaux*, through *Journ. Pharm. Chim.* [6], **20,** 128.) (1) A small fragment of the wax is dissolved in $CHCl_3$ and treated with 2 or 3 drops of HCl. If the colour changes to rose red, it is artificial.

(2) Another fragment is placed in a test-tube 0·5 c.c. of strong NaOH solution and 5 or 6 c.c. of water. If on boiling, and adding excess of HCl, a rose red colour is formed, turning pale green on the addition of ammonia, the wax is adulterated.

(3) A piece of the wax is carefully warmed in a porcelain capsule with 1 c.c. of saturated solution of borax. On stirring and evaporating to dryness, a rose-red residue will be obtained with artificially tinted wax.

Beeswax, Indian. D. Hooper. (*Agricult. Ledger* (**7**), **1904,** 73.) Indian beeswax is derived from three species of indigenous bees, *Apis dorsata*, *A. indica* and *A. florea*. The average m.p. of the wax of *Apis florea* is 64·2°C., the highest being 68°C., and the lowest 63°C. The acid value ranges from 6·1 to 8·9 ; ester value from 80·8 to 123·8 ; Huebl number, 6·0 to 11·4. The product of *Apis dorsata*, which forms the bulk of Indian beeswax, melts between 60°C. and 67°C. ; acid value, 4·4 to 10·2 ; ester value, 69·5 to 97·8 ; Huebl value, 4·4 to 9·9. *Apis indica* yields a wax melting between 62° and 64°C. ; acid value, 5·0 to 8·8 ; ester value, 84·0 to 95·9 ; Huebl value, 5·3 to 9·2. Indian beeswax therefore differs slightly from the European product in having a lower acid value. It could be produced in large quantities, and is met with in commerce free from sophistication. Besides beeswax, another wax, produced by a species closely allied to the true bees, the so-called stingless bees, *Melipona* (*Trigona*) *sp.*, has been examined. This is totally different in character from beeswax, and is viscid and dark coloured. It has the m.p. 70·5°C. ; acid value, 20·8 ; ester value, 89·6 ; Huebl value, 42·2.. The natives attribute medicinal virtues to the honey of this species, which has a peculiar flavour.

Beeswax, Saponification Value of. – Schwarz. *Zeits. für Oeffent. Chem.* through *Pharm. Centralh.*, **46,** 260.) Cohn has stated that with wax adulterated with paraffin, by saponifying only for ¾ to 1 hour, with semi-normal NaOH solution too low results are obtained, equivalent to 16 less than those obtained by 3 hours' boiling. Schwarz is unable to confirm this statement, and finds that one hour's boiling is sufficient to completely saponify even these adulterated waxes. In order to obviate any error when titrating back with semi-normal HCl solution, due to dissociation of the soap, he advises the addition of 30 c.c. of absolute alcohol to the soap solution before titration, or the employment of alcoholic rather than aqueous semi-normal HCl for the purpose. This precaution is specially needful when the cold saponification process in benzol solution is performed.

Belladonna Leaves, Determination of Alkaloid in. W. C. Forsberg. (*Pharm. Post*, **38,** 2.) Twenty Gm. of belladonna leaves dried at 100° and finely powdered is treated with 20 c.c. of 20 per cent. solution of Na_2CO_3 and evaporated to dryness on the waterbath, with frequent stirring. The dry mixture is then transferred to a stoppered bottle and macerated with a mixture of ether 90 Gm. and chloroform 30 Gm. After thorough agitation and subsequent maceration for half an hour 10 c.c. of NaOH solution, previously diluted with 5 c.c. of water, is added, agitation and maceration being continued for 2 hours. Water 20 c.c. is then added, to cause the powdered leaves to aggregate. After standing for an hour 60 Gm. of the ether chloroform solution, equivalent to 10 Gm. of the original powder, is decanted, distilled down to one-fourth its volume, transferred to a stoppered separator, the distilling flask being washed out with three successive 5 c.c. of ether; 20 c.c. of N/HCl solution is then added, followed by sufficient ether to give a distinct layer. After thorough agitation, the excess of acid is titrated back, with N/100 KOH solution and iodeosin as indicator.

By this method commercial belladonna leaves are found to give from 0·31 to 0·44 per cent. of alkaloids.

Bergamot and other Citrus Oils. H. E. Burgess and T. H. Page. (*Proc. Chem. Soc.*, **20,** 181.) Acetic acid, octylene, pinene, camphene and limene have been identified in pure *bergamot oil.* The pungency of the first fractions on distillation is attributed to the presence of acetic acid, which is also found in smaller quantities in lemon oil. The octylene in *lemon* and *bergamot oil* is identical; it gives butyric acid on oxidation with $KMnO_4$.

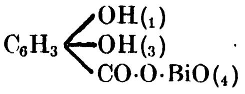
The terpineol fraction of *distilled lime oil* has given a phenylurethane m.p. 132°C., differing from that obtained from ordinary terpineol, being more soluble and crystallizing in tufts of needles. On hydrolysis it yields an oil with an intense odour of distilled lime oil.

Bermudan Bay-berries, Essential Oil of. (*Schimmel's Report, May,* **1905,** 85.) The odour of the oil is quite distinct from that of *Myrcia acris.* The yield is 3·66 per cent.; sp. gr. 1·0170 at 15°C.; $[\alpha]$ $-7°\ 3'$; phenols, 73 per cent.; solubility in alcohol, 70 per cent. 1 : 1·5 with turbidity with more than 4 volumes; in 80 per cent. alcohol 2 : 1 and more. Eugenol is the chief constituent of the phenols. The non-phenols contain lævo-phellandrene but no myrcene.

Beryl, Presence of a New Element in. J. H. Pollok. (*Proc. Chem. Soc.*, **20,** 189.) The glucina extracted from Limoges beryl was fractionated by crystallization of the sulphate, by solution in ammonicum carbonate, and by precipitation from HF solution by potassium hydrogen fluoride. The glucina of the various fractions, converted into anhydrous chloride, was found in some instances to show a progressive rise in the equivalent of the base ; the same was observed on distilling the chloride ; the most volatile portions had a markedly higher equivalent. A spectroscopic examination of the fractions with high equivalents showed that certain lines, only faintly visible in ordinary glucina, became steadily stronger as the equivalent increased, and the known lines of glucinum became fainter. It appears, therefore, that beryl contains a new element allied to glucinum, but having a much higher equivalent and a more volatile and more readily formed chloride.

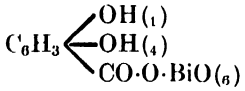
Birch Buds, Essential Oil of. H. von Soden and F. Elze. (*Berichte*, **38,** 1636.) Birch buds yield about 4·3 per cent. of a viscous yellowish oil ; sp. gr. 0·975 ; $[a]_D -2$; b.p. 265 to 295 C., with partial decomposition ; acid value, 2·1 ; ester value, 67·2 ; acetyl value, 177·8. On cooling a few crystals of a body, m.p. 50°C. separates, which is probably a paraffin. The oil consists chiefly of a sesquiterpene alcohol, betulol, $C_{15}H_{24}O$, and its acetic ester ; it contains 47·4 per cent. of the free alcohol and 31·4 of the acetate. Betulol liberated from the phthalic ester has the sp. gr. 0·975 $[a]_D -35°$, b.p. 284–288°C. with partial decomposition. It has a fragrant odour and a bitter taste. It appears to be closely allied to amyrol.

Bismuth, Salts of Organic Acids. P. Thibault. (*Bull. Soc. Chim.*, **31,** 36.) See also *Year Books*, **1901,** 42 ; **1902,** 44, 45 ; **1904,** 41. A series of bismuth salts of the benzoic acids and their congeners has been prepared, by treating crystalline anhydrous bismuth oxide with a hot saturated aqueous solution of the acid, filtering off at once, evaporating to dryness, and washing the dry residue with absolutely anhydrous ether. In this manner *Bismuth para-oxybenzoate*, $Bi3(C_7H_5O_3)$, is obtained in the form of white transparent needles decomposed by the least trace of moisture, and also by most solvents, except perfectly anhydrous ether. *Bismuth meta-oxybenzoate* is obtained in a similar manner. *Bismuth β-resorcylate*, $BiC_7H_5O_5$, in the form of insoluble needles, which decompose at 208°C., without melting, results by digesting the anhydrous oxide for several hours with excess of the acid, filtering, evaporating, and extracting the residue with alcohol. Its constitution may be represented by the formula—



$$C_6H_3\left\langle\begin{array}{l}OH_{(1)}\\ OH_{(3)}\\ CO\cdot O\cdot BiO_{(4)}\end{array}\right.$$

Bismuth oxysalicylate, similarly prepared, and also having the formula $BiC_7H_5O_5$, may be represented as—



$$C_6H_3\left\langle\begin{array}{l}OH_{(1)}\\ OH_{(4)}\\ CO\cdot O\cdot BiO_{(6)}\end{array}\right.$$

Bitter Almonds, Essential Oil of, Manipulation of the Chlorine Test for. (*Schimmel's Report, Oct.*, **1904,** 8.) A spill made with a piece of filter paper 2 × 2½ inches folded several times is saturated with the oil, excess of oil shaken off, then placed in a small porcelain dish, ignited, and immediately covered with a beaker moistened inside, the beaker being left in position for one minute after the flame is extinguished. It is then rinsed out with 10 c.c. of distilled water and tested with silver nitrate in the usual manner; any turbidity obtained should persist on boiling before it can be attributed to the presence of chlorine. It sometimes occurs that a slight precipitate of AgCN is obtained, due to volatilization of some of the HCN present in the oil; but this precipitate disappears when heated.

Bitter Orange Flowers, Formation of Essential Oil of. E. Charabot and G. Laloue. (*Bull. Soc. Chim.* [3], **31,** 937.) In the course of their investigations on the formation of essential oils in the living plant, the authors have now studied the production of neroli oil in the flowers of *Citrus bigaradia*. During the period of flowering the amount of essential oil increases sensibly in the flower; dry flowers are found to yield a higher percentage of oil than fresh. Contrary to what has been shown to occur in the leaves, the formation and accumulation of oil takes place more actively when the flower is fully developed than at an earlier period. The amount of esters in the oil distinctly but slowly increases. The amount of geraniol increases, while that of linalol slightly diminishes. No marked difference is observed in the constitution of the oil derived from the petals alone and that of the other floral organs, but the petal oil always contains slightly more methyl anthranilate. The oil from the flower buds, in May, 1903, contained 11·8 per cent. of total esters, 10·1 per cent. of terpenic esters, 1·3 per cent. of methyl anthranilate, 29·3 per cent. of free alcohols, and 8 per cent. of alcohols as esters. In the following June the amount of total esters was 15·1 per cent.; terpenic esters, 13·8 per cent.; methyl anthranilate, 1·0 per cent.; free alcohols, 33·1 per cent.; alcohols as esters, 10·8 per cent.; total geraniol, 10 per cent.; total linalol, 34 per cent. The whole expanded flowers gave, in May, an oil containing total esters, 17·1 per cent.; terpenic esters, 13·3 per cent.; methyl anthranilate, 2·9 per cent.; free alcohols, 34·9 per cent.; alcohols as esters, 10·8 per cent. In June, the oil from entire full-blown flowers gave total esters, 19·2 per cent.; terpenic esters, 16·0 per cent.; methyl anthranilate, 1·9 per cent.; free alcohols, 31·9 per cent.; alcohols as esters, 13·4 per cent.; total geraniol, 15·2 per cent.; and total linalol, 30·1 per cent. It is calculated that in each flower the petals yield 0·308 Mgm. of oil, and the other organs 0·245 Mgm.; giving a total of 0·553 Mgm.

Boric Acid, Detection of, with Tincture of Mimosa Flowers. L. Robin. (*Annales de Chim. Analyt.*, **9**, 336.) Tincture of mimosa flowers has already been used by the author as a sensitive indicator in alkalimetry. It is now stated to form an extremely delicate reagent for the detection of boric acid. The tincture is thus prepared. Ten Gm. of the flowers are heated to boiling with 200 c.c. of distilled water; after cooling, 50 c.c. of alcohol 95 per cent. is added and the mixture allowed to stand for 1 hour. It is then filtered into a non-actinic glass bottle (*Annales de Chim. Analyt.*, **8**, 130). Boric acid *in a mixture of salts* is thus detected. The solution rendered alkaline with sodium carbonate is boiled and filtered. One drop of the mimosa tincture is placed on the bottom of a small white capsule, together with a few drops of the filtrate, and just sufficient HCl cautiously added to discharge the yellow tint. On evaporating to dryness on the water-bath a yellow residue is obtained, which turns red when moistened with a few drops of 10 per cent. Na_2CO_3 solution if boric acid be present; in its absence the residue is greyish, turning yellow with the carbonate. If only *traces of boric acid* are sought a more delicate application of the test may be made with test paper prepared by saturating white filter paper with the tincture previously diluted with 25 per cent. of distilled water, and drying. The alkaline filtrate, rendered faintly acid with HCl, is evaporated to a small volume on the water-bath; a strip of the test-paper 1·5 cm. wide and 2 to 3 cm. long is then soaked in the liquid and the whole evaporated to dryness. The dry paper will then be coloured and react as described above, in presence of boric acid. In *wines*, *ciders*, and similar liquids as little as 10 or 15 c.c. is sufficient to test. This quantity is evaporated to dryness, ashed, the residue taken up with a little water, filtered, and treated as above. *Milk* is first coagulated by means of acetic acid, and the serum from about 15 c.c. filtered off: this is rendered neutral with Na_2CO_3, using mimosa tincture as indicator, boiled, filtered, and evaporated, the residue ashed, then treated as described previously.

Boucheria griffithiana Bark, Lupeol in. Tollens and Sack. (*Berichte*, **37,** 4105.) Lupeol $C_{26}H_{42}O$, identical with the lupeol found in lupin pods by E. Schulze and Likiernik, is extracted with alcohol from the bark of *Boucheria griffithiana*. When crystallized from dilute alcohol, the needles formed melt at 209°C.

Bromine Absorption Equivalent of Fatty Bodies, New Method for Determining. F. Telle. (*Journ. Pharm. Chim.* [6], **21,** 111, 183.) It is claimed that by the following *modus operandi* a definite bromine equivalent is obtained with fats, the results being solely those of bromo-addition, and not vitiated by substitution reactions. At the same time loss of bromine, such as occurs in other methods, is avoided. The following solutions are requisite. (1) N/10 As_2O_3 solution obtained by dissolving 4·95 Gm. of As_2O_3 in 10 c.c. of strong NaOH solution, transferring to a graduated litre flask, acidifying with 100 c.c. of pure HCl and adjusting to 1 litre. (2) Solution of chlorinated soda, approximately decinormal, obtained by diluting 35 to 40 c.c. of the commercial solution to 1 litre. This is set against the arsenical solution thus: 20 c.c. of the N/10 As_2O_3 solution is treated with 5 c.c. of 10 per cent. KBr solution and sufficient of the chlorinated soda solution run in from a burette to exactly discharge the colour of the free bromine. The equivalents of the two solutions being established, exactly 1·25 Gm. of the oil (or 0·625 for drying oils) is weighed out, and dissolved in pure $CHCl_3$ or CCl_4 and made up to 50 c.c. with the solvent; 10 c.c. of this solution, equivalent to 0·25 Gm. of the fat or 0·125 Gm. of drying oil, is introduced into a glass stoppered 300 c.c. Erlenmeyer flask; to it are added 5 c.c. of 10 per cent. KBr solution, 1 c.c. of pure HCl, then slowly and with constant agitation a known volume of the standard hypochlorite solution, avoiding too great excess of bromine and loss by volatilization; thus for cod-liver oil and almond oil 30 c.c. should be added, for most other oils 25 c.c., for lard and margarines 20 c.c., butter and suets 15 c.c., and coconut butter 10 c.c. In this way no vapour of bromine is seen in the air of the flask, and almost all is in solution in the CCl_4. The whole is then set aside in the dark, without agitation, for 20 minutes. The unabsorbed bromine is then determined; 20 c.c. of the standard As_2O_3 is run in, and the whole well shaken so as to divide the CCl_4 thoroughly in the liquid, which is then titrated with the standard hypochlorite solution until the aqueous solution acquires a yellow tint, which on agitation passes into the CCl_4. The end-reaction is very sharp, one drop causing the change. The number of c.c. of chlorinated soda solution used is read off, and the equivalent of the 20 c.c. of N/10 As_2O_3 added, deducted from the *total* volume of the chlorinated soda used. The remainder will be the equivalent of the bromine absorbed by 0·25 Gm. of the oil, or by 0·125 of a drying oil. Thus, supposing 18 c.c. of the chlorinated soda solution is equivalent to 20 c.c. of the N/10 As_2O_3 solution, 1 c.c. of this solution liberates $\frac{0{\cdot}160}{18} = 0{\cdot}0088$ Gm. of Br. Then for 0·25 Gm. of oil there has first been used 25 c.c. of chlorinated soda, 20 c.c. of N/10 As_2O_3, and finally 7·7 c.c. of the former; so $25 + 7{\cdot}7 - 18 = 14{\cdot}7$. 100 Gm. of the oil will therefore fix $\frac{0{\cdot}0088 \times 1{\cdot}47 \times 100}{0{\cdot}25} = 52{\cdot}21$ Gm. of bromine, which is therefore the bromine value.

The following values have been obtained. Oils of sweet almonds: 69·87 and 74·37; arachis oil, 53·24; cotton seed oil, 64·25; poppy seed oil, 76·28 and 78·69; olive oil, 51·20, 52·24, and 54·00; sesame oil, 66·00 and 65·70; lard, 35·5, 38·30, and 40·3. Butter from Reims, 24·38; from Aisne, 23·23; from Ardennes, 25·32; oleomargarine, 28·96; coconut butter, 5·13; cold-drawn castor-oil, 52·24; pale cod-liver oil, 83·44; dark cod-liver oil, 83·10; cacao butter, 23·69; linseed oil, 96·15 and 95·07; Colza oil, 64·32; neatsfoot oil, 56·03; tallow, 54·41 and 23·86.

Bromo-methyl hepty Ketone. H. A. D. Jowett. (*Proc. Chem. Soc.*, **21**, 117.) By treating methyl heptyl ketone in $CHCl_3$ with Br, and subsequently fractionating bromomethyl heptyl ketone, $C_9H_{17}OBr$ was obtained as a pale yellow liquid, b.p. 122° under 15 mm. It has a characteristic odour and its vapours cause profuse lachrymation.

Buffalo Milk, Lactose in. C. Porcher. (*Bull. Soc. Chim.* [3], **29.**) The sugar of buffalo milk is found to be lactose, and not a specific sugar, as stated by Pappel and Richmond, which they named tewfikose.

Cajuput Oil, Green Colour of. H. C. Prinsen Geerling. (*Pharm. Weekblad*, **41,** 1081, through *Schimmel's Report, May,* **1895,** 12.) That the green colour of cajuput oil, due to traces of copper, cannot be removed by shaking out with water is attributed to the fact that oil contains small quantities of butyric and valerianic acids, free and as esters, which retain the copper in solution. Samples of copper-free cajuput oil, from which free acids and esters have been removed, and to which various organic acids have then been added, are found to be coloured green when brought into contact with metallic copper. But only those to which butyric or valerianic acid had been added failed to give up the copper salt when shaken with water. Valerian oil also acquires a green colour on contact with copper, which is not removed by shaking out with water.

Calophyllum inophyllum, Fixed Oil of Seeds of. G. Fendler. (*Apoth. Zeit.*; **20,** 6.) The seeds of *Calophyllum inophyllum* give 50-55 per cent. of a yellowish green acrid oil when extracted with ether. It has a faint odour, resembling that of fenugreek. It is insoluble in absolute alcohol and in glacial acetic acid, but dissolves in other fat solvents. The sp. gr. at 15°C. is 0·9428; Reichert-Meissl number, 0·13; acid number, 28·45; saponification number, 196; iodine number, 92·8. It absorbs oxygen to the extent of 1·84 per cent. of its weight in 136 hours. When shaken out with 5 per cent. NaOH solution a green resin is removed, leaving the oil yellowish in colour. H. Kleist has found that the oil, and especially the resin, has a toxic action on frogs.

Calycanthine. H. M. Gordin. (*Proc. Amer. Pharm. Assoc.*, **52,** 345.) The alkaloid calycanthine, first isolated by Eccles (*Year Book*, **1888,** 162) from the seeds of *Calycanthus glaucus*, has been re-examined. The fat-free seeds were found to yield a little over 2 per cent. of the base by extraction with Prollius' fluid, but to obtain it in conjunction with the acid present in the drug extraction with hot alcohol was resorted to, by which means a yield of 75 per cent. of the total alkaloid present was obtained. After distilling off the solvent, the residue was taken up with faintly acidified water, filtered, and the filtrate precipitated with KOH. The crude calycanthine thus obtained was collected, washed, redissolved in H_2SO_4, and reprecipitated. It was then dried at 40–50°C. and dissolved in 10 times its weight of acetone. After filtering off from the non-alkaloidal insoluble matter, a previously prepared and cooled mixture of one part of H_2SO_4 and 5 parts of EtOH is added, drop by drop, until no further precipitate is formed. The crystalline alkaloidal sulphate thus obtained is quite white, and is insoluble in the alcohol-acetone mixture. After washing the precipitate with acetone, it is dissolved in water, and the base liberated with AmOH. This is further purified by resolution in acid and reprecipitation, being ultimately converted into the hydrochloride and digested with animal charcoal. The base liberated from this salt is recrystallized from acetone and water until a constant m.p. is attained. It crystallizes from alcohol in large glassy prisms, from acetone and water in smaller crystals of the same form: m.p. 243–244°C. It forms crystalline salts, the sulphate, hydrochloride, and acetate being very soluble in water, the hydriodide and nitrate are less soluble. The aqueous solutions of the sulphate and hydrochloride are acid to litmus, the basicity of the alkaloid being feeble. The hydrochloride crystallizes from hot alcohol in large, heavy, vitreous prisms which soon become white and fall to a white powder on the slightest touch when dried over H_2SO_4. It forms a beautiful platinochloride, beginning to darken at 221°C. and ultimately black at 250°C., without showing a definite m.p. In alkaline solution a minute trace of calycanthine reduces $AuCl_3$. The reaction may be obtained with a 1 : 1,000,000 solution of the base; with Mandellin's reagent it gives a fine red colour, and HNO_3 a green colour, with H_2SO_4 and $K_2Cr_2O_7$ a rose-red tint. Cushny finds that when injected hypodermically into cats and rabbits it had no distinct effect in 5 Mgm. doses per kilo of body weight, but 20 Mgm. doses per kilo gave rise to violent tetanic spasms, similar to those produced by strychnine. It acts as a spinal stimulant and a heart depressant, producing symptoms similar to those found in cattle poisoned with *Calycanthus*,

Camphor, Determination of, in Liniment of Camphor. J. Lothian. (*Pharm. Journ.* [4], **20,** 582.) Simple heating on the waterbath in a flat-bottomed dish is sufficient to drive off all the camphor in about an hour, and no corrections are necessary, as when the oil is heated at a higher temperature. It is suggested that the following test should be included in the official test : " Five Gm. heated in a flat-bottomed dish for one hour on the waterbath should lose not less than 1 Gm."

Camphorated oil when exposed to the air at the ordinary temperature loses camphor fairly rapidly. An oil which contained 21·88 per cent. of camphor exposed in an evaporating basin for 4 days then contained 19·53 per cent. of camphor. Camphor is dextrorotatory in solution, and the strength of a camphorated oil can be quickly determined by the polarimeter.

(See also *Year-Book*, **1903,** 48.)

Cananga Oil Adulterated with Coconut Oil and Resin. (*Schimmel's Report, May*, **1905,** 19.) Two sophisticated specimens of Cananga oil are reported on, one containing 50 per cent. of coconut oil, the other 20 per cent. of resin. The former had the sp. gr. 0·9256 at 15°C. ; $[\alpha]_D -3^\circ\ 50'$, and saponification number 200·4 ; pure Cananga oil has the sp. gr. 0·910 to 0·950 $[\alpha]_D -17^\circ$ to -55° and saponification number 10 to 36. This adulterated oil solidified at moderately low temperatures. The resin-containing oil had the sp. gr. 0·9716 ; $[\alpha]_D -11^\circ\ 40'$, and saponification number 43·11. On steam distilling only 75 per cent. was volatilized, the residue being a brittle resin. Pure Cananga oil does not leave more than 5 per cent. of non-volatile residue by steam distillation.

Capparis spinosa, Caper-rutin in. D. H. Brauns. (*Archiv der Pharm.*, **242,** 556.) The flower buds of *Capparis spinosa* preserved in vinegar, the familiar pickle known as "capers," are found to contain 0·32 per cent. of a rhamnoside caper-rutin, $C_{27}H_{30}O_{16} \cdot 3H_2O$, closely allied to rutin from *Ruta graveolens*. When dried in the water-oven or desiccator it loses 1 mol. H_2O, and becomes anhydrous at 100°C. *in vacuo*, or at ordinary pressure at 110°C. Like rutin and sophorin, it yields on hydrolysis quercitin, rhamnose, and glucose.

Caraway Oil, Constituents of. (*Schimmel's Report, May*, **1905, 20.**) In addition to carvone and carvene, a small quantity of a base with a narcotic odour, dihydro-carvone, and dihydrocarveol have been isolated from caraway oil.

Carthamus tinctorius Fruit, Fixed Oil of. G. Fendler. (*Apoth. Zeit.*, **19,** 721.) The fruit of *Carthamus tinctorius* from German East Africa yields 25·82 per cent. of fixed oil; the separated kernels of the seeds give 50·37 per cent. It has the following characters: Sp. gr. at 15°C., 0·9266; m.p. 5°C.; it begins to cloud at −13°C., and is not wholly solid at −18°C. Reichert-Meisl value, 0; acid value, 11·63; saponification value, 191; iodine value, 142·2; refraction index at 40° = 65. It is a slow drying oil. The fatty acids of the oil have the sp. gr. 0·9135 at 15°, m.p. 17°C., freezing point 12°C.; acid value, 199; mean molecular weight, 281·8; acetyl number, 52·9; iodine value, 148·2. The liquid fatty acids have the iodine number 150·8, and the mean molecular weight 293·1.

Cascara Sagrada, Chemical Examination of the Bark. H. A. D. Jowett. (*Proc. Amer. Pharm. Assoc.*, **52,** 288.) The presence of emodin first demonstrated by Schwabe (*Year-Book*, **1889,** 140) was confirmed, also that of a small amount of a substance isomeric with emodin, but insoluble in ammonia: m.p. 183°C. Glucose was detected, and also a body which yielded syringic acid when treated with acid. This acid does not exist, as such, in the bark. No indication of the presence of chrysophanic acid or of chrysarobin was obtained. Probably previous investigators have mistaken emodin for one or both of these bodies. Although emodin is insoluble in water, it is soluble in the aqueous extract of the bark, and is shaken out with difficulty from such solutions by means of immiscible solvents. After treatment with acids, however, the emodin present is readily removed by such solvents. This might lead to the inference that the emodin was the product of hydrolysis of a glucoside; but if the greater part be first removed from the aqueous bark extract by repeated shaking out, only a trace more is obtained after hydrolysis with acid. Schwabe's conclusions as to the absence of a glucoside yielding emodin on hydrolysis were thus confirmed. No pure substance analogous to the cascarin of Le Prince (*Year-Book*, **1893,** 131) or the purshianin of Dohme and Englehardt could be detected (*Year-Book*, **1899,** 134), nor was the crystalline principle described by Prescott obtained. The bark was found to contain about 2 per cent. of fat, consisting of rhamnol arachidate, free arachidic acid, and substances, probably glycerides, which yield linolic and myristic acid on hydrolysis. Rhamnol, $C_{20}H_{34}O$, an alcohol, m.p. 135°–136°C., is identical with the alcohol obtained by Power and Lees from Kô-Sam seeds (*Year-Book*, **1903**, 503). The bitter principle and its derivatives were not obtained in a crystalline form. No chemical difference could be detected between bark one year and three years old. Beyond slight differences in the amount of extractive, the examination of the bark of *Rhamnus purshianus* and of *R. californicus* gave identical results. A hydrolytic enzyme which hydrolized amygdalin was isolated ; but this had no griping action in 1 Gm. doses. Emodin was found not to be the active principle ; it exerts but little if any influence on the aperient action of the drug. This purging principle is contained in that portion of the lead subacetate precipitate which is extracted by acetic ether, and is soluble in water No crystalline body could be obtained from this.

Castor Oil, Suggested Official Characters and Tests for. L. Myddelton Nash. (*Chem. and Drugg.*, **65**, 1023.) The monograph of the British Pharmacopœia requires revision. The only physical constant given in the B.P. is the sp. gr., the range of which (0·950 0·970) is considerably too wide.

It is suggested that the following characters and tests should be given : Sp. gr. at 15·5, 0·958 to 0·966.

Acidity.—Not over 1·5 per cent. expressed as oleic acid.

The optical rotation and refractive index of this oil are very constant, the following figures being typical :—

	Sample No 1.	Sample No 2
Rotation in 100 mm. tube	4°30′	4°30′
Refractive index $[\eta]_D$ at 20 C	1·4785	1·4786

These tests might therefore also be included in the next edition of the B.P.

Catechin and Acacatechin. A. G. Perkin. (*Proc. Chem. Soc.*, **21, 89.**) The statement of Clauser that anhydrous Gambier catechin melts at 210°C. could not be substantiated. The m.p. previously found by the author, 175–177°C., is confirmed. *Acacatechin*, $C_{15}H_{14}O_6+3H_2O$, dried over H_2SO_4, loses 1 H_2O and differs from catechin, $C_{15}H_{14}O_6+4H_2O$, which under these conditions loses $3H_2O$. Acacatechin tetramethyl ester yields the acetyl compound $C_{15}H_9O_6(CH_3)_4 \cdot C_2H_3O$ in colourless needles, m.p. 135-137°C., and on oxidation with $KMnO_4$ gives veratric acid and probably phloroglucinol dimethyl ester. With H_2SO_4 or HCl in the presence of $HC_2H_3O_2$ both catechin and acacatechin give an orange red anhydride, insoluble in alkaline solution, but which is not identical with the catechuretin of Krauft and Delden or of Etti. When oxidized with $K_6Fe_2Cy_{12}$ in the presence of an alkali acetate, both catechins yield a new colouring matter which dyes mordanted fabrics orange brown. (See *Year-Book*, **1902,** 85 ; **1903,** 53.)

Cecropia peltata, Active Principles of. — Alboni. (*Repertoire* [3], **17,** 17.) *Cecropia peltata* is an Urticaceous tree indigenous to the Antilles. By extracting the crushed leaves with water, evaporating to a syrupy consistence, adding just enough alcohol to precipitate the albuminous matter, filtering this off, and distilling off the alcohol from the aqueous filtrate, then decolorizing it with animal charcoal and concentrating and treating the syrupy liquid with alcohol 95 per cent., a precipitate of *cecropidine* was obtained, which when redissolved in water and reprecipitated with methylic alcohol, crystallized in white microscopic lamellæ. On concentrating *in vacuo* the mother liquor from which the cecropidine was precipitated, and precipitating it with absolute alcohol, a viscous mass of *cecropine* was obtained, which crystallized from alcohol 90 per cent. in long needles, m.p. 59°C., lævorotatory, $[\alpha]_D$ −5°77 in aqueous solution. It has an acid reaction and forms an unstable compound. It precipitates with alkaloidal reagents and gives off an ammonia compound when heated with lime. It also reduces alkaline cupric tartrate solution. Cecropidine is neutral to litmus and is optically inactive, and has a slight reducing action on Fehling's solution. Like cecropine, it contains nitrogen and gives off ammoniacal vapour when heated with lime.

The roots of *Cecropia* contain the same constituents as the leaves, also a complex oleoresin composed of a crystalline acid, *cecropic acid,* and an essential oil which has an odour resembling that of rum. The leaves of *Cecropia* are employed in Cuba as a remedy for asthma, and the root is considered to be diuretic and alterative ; it is also given as a substitute for digitalis. Gilbert and Carnot have found that extract of *Cecropia* has a distinct diuretic action and affects the arterial system and the heart. One per cent. solution of cecropine administered by hypodermic injection to dogs increased the heart beats, but had not the same diuretic action as the extract of the leaves.

Cinnamomum loureirii, Essential Oil of; Oil of Nikkei. (*Schimmel's Report, Oct.*, **1904,** 96.) The oil, distilled in Japan from the leaves and young twigs of *Cinnamomum loureirii*, is bright yellow and has a pleasant odour of citral and cinnamon. The yield is 0·2 per cent. Sp. gr. 0·9005 at 15°C., $[\alpha]_D - 8° 45'$; acid value, 3·01; ester value, 18·6; solubility in alcohol 70 per cent., 1 : 2 to 1 : 2·5 with opalescence. It contains 27 per cent. of aldehydes, chiefly citral, with 40 per cent. of linalol and some cineol in the nonaldehydic portion of the oil. No cinnamic aldehyde was detected, although Shimoyana has recorded its presence in the oil of the root-bark of the tree.

Citronella, Essential Oil of, Official Testing of, in Ceylon. (*Ceylon Observer, August* 16, **1904,** through *Schimmel's Report, Oct.* **1904,** 19.) In order to check the extensive adulteration now prevalent with citronella oil, the Government of Ceylon intend to supervise the quality of the oil exported. Bamber's test [see *Year-Book*, **1904,** 62] has been officially selected for the purpose. Oils which do not indicate more than 1 per cent. foreign matter will bear an official red seal and will be classed as "pure" oil. Oils found to be adulterated beyond this up to 10 per cent. of admixture will bear a green seal and be known as "90 per cent. purity" oils. Oils indicating more than 10 per cent. of impurity by Bamber's test will not be passed for export. The opinion is expressed that, although Bamber's test may be useful for obtaining qualitative results, it is not reliable as a quantitative method. Preference is given for the modified Schimmel's test [*Year-Book*, **1904**, 61]. Instances are given in which citronella oil of exceptionally fine quality, assaying 60 per cent. of "total geraniol," and passing the "modified Schimmel" test, was indicated by Bamber's method to contain 5 per cent. of impurity. These oils are nevertheless considered to be pure.

Citroptene, the Stearoptene of Essential Oil of Lemon. E. Schmidt. (*Archiv. der Pharm.*, **247,** 288.) Citroptene is obtained by treating the distillation-residue of lemon oil with ether, in which it is but sparingly soluble, and purifying by recrystallization, first from a mixture of acetone and methyl alcohol, then from dilute alcohol, decolorizing the solution, if necessary with animal charcoal. Thus obtained, it forms colourless brilliant needles, m.p. 146-147°C., subliming at a higher temperature. Its alcoholic solution has a fine violet fluorescence. Schmidt confirms the statements of Tilden and Burrows, with whose limettin lemon oil citroptene is identical [*Year-Books*, **1892,** 71; **1902,** 106), and of Kostanecki and Ruyter, that citroptene is a dimethyloxycoumarin, and has prepared the body synthetically.

Civet, Adulterated. E. J. Parry. (*Chem. and Drugg.*, **65**, 168.) At the present moment (July, 1904) it is hard to find much genuine civet on the market; practically all samples recently examined are adulterated with vegetable carbohydrate matter. The presence of this adulterant is best shown by exhausting the civet with light petroleum ether, when a more or less translucent jelly-like mass remains undissolved. After well washing on a filter-pump with petroleum ether, the residue is dried, and will be found to be very largely soluble in water. It either does not reduce Fehling's solution, or, if so, only slightly, and then no doubt on account of a slight hydrolysis that has been brought about by the presence of free acid in the civet. On boiling the residue with a few drops of hydrochloric acid, and neutralizing, a copious reduction of Fehling's solution takes place. The amount may be approximately determined by weighing the well-washed residue allowing for the hairy débris, etc., and checking by the amount of sugar obtained on hydrolysis. Several samples have been met with which contained petroleum, coconut fat, and the vegetable matter above described. The petroleum was separated almost quantitatively by exhausting with acetone, and then extracting the petroleum from this solution with petroleum ether. It is obtained as an odourless jelly of the ordinary type. The coconut oil was suspected by the smell, and confirmed by the steam-distillation of characteristic fatty acids after hydrolysis. On keeping for a few weeks in the hot weather, the peculiar rancidity of coconut fat was well developed.

Cloves, Essential Oil of, Refractive Index of. H. W. Simmons. (*Chem. News*, **90,** 146.) Pure eugenol has a high refractive index, $[\eta]_D^{20^\circ}$ 1·5412, and the refractive index of pure clove oil is directly proportional to its eugenol content, as shown by the following figures. With samples whose genuineness cannot be guaranteed, however, it is not safe to base an opinion on the refractive index only, as is shown by No. 9 of the accompanying table, which is evidently grossly adulterated, judged by the high specific gravity compared with its low proportion of eugenol, though from its refractive index it might be expected to contain about 86 to 88 per cent. of phenols.

No.	Specific Gravity, 15 / 15°	Rotation $[\alpha]_D$	Refractive Index n_D 20°	Phenols Per cent
1	1·0606	—	1·5382	93
2	1·0509	0° 44′	1·5318	88
3	1·0503	−0° 53′	1·5304	86
4	1·0475	−1° 0′	1·5304	86
5	1·0455	0° 23′	1·5297	85·5
6	1·0560	−0 35′	1·5340	92
7	1·0549	0 40′	1·5340	91·5
8	1·0507	−0° 51′	1·5336	87
9	1·0617	−0° 20′	1·5327	82

Cobalt, New Reaction for. E. Pozzi-Escot. (*Annales de Chim. Analyt.*, **10,** 147.) If to a very dilute solution of a cobaltic salt a few drops of alcoholic solution of β-naphthylthiohydatoic acid be added, then a drop of ammonia, an intense crimson colour is obtained. Nickel, under similar conditions, gives a yellow ochre colour or a dirty grey precipitate, which may completely mask the cobalt reaction. But the latter may be rendered evident in the presence of nickel by employing an excess of ammonia, which precipitates the nickel; the cobalt salt is, however, sufficiently soluble to afford the colour reaction.

Cocaine and Morphine, New Reactions of. C. Reichard. (*Pharm. Zeit.*, **49,** 855.) Uranium nitrate gives a yellow precipitate with cocaine hydrochloride. On adding a few drops of potassium thiocyanide to a 1 per cent. uranium nitrate solution, a deep yellow solution is formed. On adding a very dilute solution of cocaine hydrochloride to this, a deep yellow precipitate is formed. Both cocaine and morphine give a red brown colour when added to a mixture of potassium ferricyanide and uranium nitrate. With a small quantity of a mixture of potassium ferricyanide 6·48 Gm. and uranium nitrate 5·04 Gm. in the presence of a very little water and solid cocaine hydrochloride, the reaction is immediate; in dilute solutions the reaction only takes place slowly, and on evaporation with morphine an immediate reaction is obtained even with dilute solutions. On mixing 2·5 Gm. of $CuSO_4$ and 6·6 Gm. of $K_6Fe_2Cy_{12}$, the reddish yellow powder formed gives a yellowish precipitate on the addition of water, but the presence of a trace of morphine converts this at once into the characteristic red brown of copper ferrocyanide. No such reaction occurs with cocaine. On adding a few crystals of a cocaine salt to a few drops of copper ammonio-sulphate and allowing the mixture to evaporate spontaneously, a green coloration is obtained. Morphine salts give no such reaction. But if a copper salt in powder be mixed with a morphine salt and the mixture be treated with a few drops of H_2SO_4 and warmed, a fine violet colour is developed. No reaction occurs in the cold. Both cocaine and morphine may be detected by copper ammonio-sulphate reagent. The cocaine is first detected by the formation of the green colour as described above; the liquid is then cautiously evaporated to dryness, treated with a few drops of H_2SO_4 and warmed, when the characteristic violet colour of morphine becomes evident.

Cod-Liver Oil. E. H. Gane. (*Proc. Amer. Pharm. Assoc.*, **52**, 357.) Continued experience has proved the value of the nitric acid test described by the author last year (*Year-Book*, **1904**, 200). The use of nitro-sulphuric acid recommended by some analysts does not give such good results, the change from rose red to lemon yellow being less definitely shown. Two drops of HNO_3 to 15 of oil is now recommended as giving the best reaction; a fine rose-red colour is given by pure oil, changing to lemon yellow in half an hour; adulterated oil will give a dirty brown or blackish mixture.

It is suggested that there should be an official test for free fatty acids, since oil containing much of these is less suitable for medicinal use, as it causes eructation. This may be determined as follows: Weigh off 25 to 50 Gm. of the oil into a small flask, and add 100 c.c. of perfectly neutral alcohol; shake well and heat to boiling point (of the alcohol ?) on the water-bath; add a few drops of phenolphthalin and run in $N/\frac{1}{2}$ NaOH solution until a pink tint is evident. The number of c.c. of alkali used $\times 0{\cdot}141$ will give the amount of free acid in the oil calculated as oleic acid. The best Norwegian and Newfoundland oils are found to give less than 1 per cent. of free acid; of 16 samples examined, the lowest contained 0·06 per cent., the highest 4·52 per cent.

Cod-Liver and other Fish Oils. J. F. Liversege. (*Pharm. Journ.* [4], **19**, 143, after *Analyst.*) The following tables give the results of the examination of a series of cod liver and fish and vegetable oils :—

SAMPLES OF COD-LIVER OIL.

	Norwegian.			Newfoundland.			Origin Unknown.		
	A.	B.	C.	D.	E.	F.	G.	H.	J.
Oil.									
Specific gravity, 15·5°C.	0·928	0·928	0·928	0·928	0·926	0·927	0·928	0·927	0·928
Zeiss butyro-refractometer at 25°C.	80·0	79·7	79·7	79·0	76·3	79·0	80·0	77·3	80·0
Zeiss butyro-refractometer at 40°C.	71·0	70·7	70·3	70·3	67·7	70·0	71·0	68·7	71·0
Rotation (200-millimetre tube)	−0·5°	−0·5°	−0·5°	−0·5°	−0·5°	−0·6°	−0·7°	−0·4°	−0·6°
Huebl, iodine per cent.	168	162	167	164	154	160	165	154	164
KHO required per cent. for free acid	0·1	0·1	0·2	0·2	0·1	0·2	0·1	0·2	0·1
KHO total per cent.	18·7	18·5	18·7	18·7	18·8	18·7	18·6	18·9	18·6
Valent a test (°C.)	95	95	96	95	94	95	96	93	94
Unsaponifiable matter per cent.	—	—	1·2	—	1·1	—	—	—	—
Fatty Acids.									
Zeiss butyro-refractometer at 40°C.	57·0	56·7	56·7	55·7	53·7	56·3	57·0	54·7	56·7

SAMPLES OF FISH AND OTHER OILS.

	Seal.	Shark.	Dugong.	Haddock.	Menhaden.	Whale.	Brusmer.	Hoi.	Ling.	Arachis.	Sesame.	Cotton-seed.
Oil.												
Specific gravity, 15·5°C.	0·925	0·962	0·919	0·934	0·931	0·917	0·923	0·919	0·923	0·916	0·922	0·923
Zeiss butyro-refractometer at 25°C.	72·7	87·3	60·3	84·0	80·7	65·0	75·0	73·7	74·0	63·7	68·0	68·7
Zeiss butyro-refractometer at 40°C.	64·0	77·7	52·0	74·3	71·3	56·0	66·3	64·7	65·0	55·3	59·7	60·0
Rotation (200-millimetre tube)	0°	−0·5°	−0·1°	−0·5	−0·4°	−1·0°	−0·5°	−4·0°	−0·6°	0°	+0·9°	0°
Huebl, iodine per cent.	132	142	69	179	174	94	138	124	133	84	106	112
KHO required per cent. for free acid	0·5	2·2	0·5	0·6	0·5	0·4	0·1	0·1	0·1	0·3	0·2	0·1
KHO total per cent.	19·4	6·0	20·2	19·3	19·3	18·8	18·3	16·9	18·8	19·1	19·2	19·6
Valent a test (°C.)	88	35	86	73	78	100	108	113	105	102	85	90
Unsaponified matter per cent.	1·0	84·0	0·9	1·0	0·6	1·0	—	—	—	—	—	—
Fatty Acids.												
Zeiss butyro-refractometer at 40°C.	49·7	—	37·7	60·7	57·3	43·3	53·3	52·7	52·3	42	46	46

The " brusmer " and " hoi " oils were obtained from Norway for the author by the late J. Barclay. " Brusmer " oil is probably derived from *Brosmius broma*, one of the *Gadidæ*. " Hoi " might possibly be from the common piked dogfish, which is known as " hoe " in the Orkneys.

Cod-Liver Oil, Kremel's Reaction for. Schamelhout. (*Bull. Soc. Roy. de Brux.*, through *Repertoire* [3], **17,** 116.) From published records it is evident that different workers variously modify the details of manipulation in applying Kremel's HNO_3 test to cod liver oil. Some place 10 drops of the oil in a watch glass standing on white paper and add 3 drops of the acid, to the edge of the oil. When pure it is said to assume a rose-red tint. Others employ 20 drops of oil and 2 drops of acid, and agitate, when a rose-red colour passing to reddish yellow, then to lemon yellow, is obtained ; with 15 drops of oil and 3 drops of acid agitated together, a fire-red, then lemon-yellow colour is obtained. Yet another method consists of putting 10 or 15 drops of the oil in a capsule, then adding 3 to 5 drops of acid, when the red colour appears at the zone of contact and spreads through the bulk of the oil, on agitation the final tint being lemon yellow. Schamelhout finds that the final tint may be brown, and that the whole series of colours may be greatly modified by the conditions of the test, the temperature and the depth of the oily layer. Even with the same oil and acid different shades of colour are obtained. Not only so, but the substance which gives the colour reaction is influenced by light, so that oil which has been exposed to sunlight loses its properties of giving the rose-red tint. Also oil which answers the test may, according to Schneider, contain as much as 20 per cent. of fish oil, 15 per cent. of skate liver oil, 30 per cent. of vaseline, and 30 per cent. of sesame oil, and yet give a good reaction with HNO_3.

Cod Liver Oil, Suggested Official Character and Tests for. J. C. Umney and C. T. Bennett. (*Chem. and Drugg.*, **66,** 129.) After reviewing the published physical and chemical " constants " for this oil, the following monograph is suggested to replace that at present in the Pharmacopœia :—

Oleum Morrhuæ Purificatum (*Refined Cod Liver Oil*). The oil extracted from the fresh liver of the cod, *Gadus morrhua, Linn.*, by the application of a temperature not exceeding 180°F. (82·3°C.)

and from which solid fat has been separated by filtration at about 23°F. (−5°C.).

Characters and Tests. Pale yellow, with a slight fishy but not rancid odour and a bland fishy taste. Sp. gr., 0·925 to 0·931. No solid fat should separate on exposure of the oil for 2 hours to a temperature of 32°F. (0°C.). Readily soluble in ether, chloroform, and carbon bisulphide, and slightly soluble in alcohol (90 per cent.). Refractive index (at 20°C.) not below 1·4790. Saponification value, 179 to 198; iodine value (18 hours' absorption), 154 to 170. Free fatty acids (calculated as oleic) should not exceed 1·5 per cent. M.p. of fatty acids, 23° to 26°C. Unsaponifiable matter not exceeding 1·5 per cent. One c.c. of the oil dissolved in 10 c.c. of carbon bisulphide should give a violet-blue colour with 1 drop of sulphuric acid.

Cod Liver Oil, Suggested Official Characters and Tests for. E. J. Parry. (*Chem. and Drugg.*, **66,** 491.) Figures for forty typical oils are given, representative of a large number of samples. From the consideration of the results, the *sp. gr.* of Umney and Bennett (*supra*) 0·925 or 0·924 to 0·931 is accepted. For *acidity* Umney's figure of 1·0 per cent. is considered to be quite high enough, since many fall below 0·5 per cent., and anything above 1·0 per cent. usually means a very rancid odour.

Saponification value is stated to be of little value except in cases of gross adulteration. *Unsaponifiable matter* is considered to be of great moment. Mann's figures (*Southall's Report*, **13,** 9), 4·12 to 6·21 per cent., are stated to be quite erroneous and misleading. This figure should not exceed 1·5 or 1·6 per cent.; only oils from putrid livers would show from 2·4 to 4·6 per cent., with correspondingly high acid values. The *Iodine value* should lie between 155 and 170, and the *Reichert value* not exceed 0·7 for good medicinal oils, although pure oils may exceed 1·0.

Codeine, Determination of, in Opium. C. E. Caspari. *Apoth. Zeit.*, **19,** 874.) 50 Gm. of opium are extracted with 500 of water and the extraction method of the U.S.P. process for the determination of morphine followed. The aqueous extract thus obtained is evaporated to about 250 c.c. on the water-bath. To this barium acetate 5 Gm. is added and the liquid diluted to 700 c.c. The solution is then filtered, the precipitate washed with cold water, the filtrate and washings are again concentrated and treated with another 5 Gm. of barium acetate. The filtration, concentration and addition of the barium salt are continued as long as any precipitate is formed on dilution. The liquid is again concentrated and a slight excess of NaOH solution, 10 per cent., added. This precipitates thebaine, papaverine and narcotine, which are filtered out and washed. The filtrate and washing are acidified with dilute HCl and again concentrated. The cold liquid is then treated with excess of AmOH solution 12 per cent., which precipitates most of the morphine. This is removed by filtration and washed; the process of acidifying, concentrating and precipitating with AmOH being repeated. After again acidifying, the liquid is concentrated to 75 c.c. and shaken out with successive portions of benzol, which removes codeine but not narcotine; after evaporating off the solvent, the coloured amorphous residue is treated with a known volume of $N/_{10}H_2SO_4$ in excess; and this excess titrated back with $N/_{10}NaOH$, cochineal being used as indicated. By this method 1·12 and 1·33 per cent. of codeine has been found in two samples of opium. (See also *Year-Book*, **1903,** 122.)

Colcothars, Analysis of. H. Cormiboeuf. (*Annales de Chim. Analyt.*, **10,** 95.) Different varieties of colcothar, forms of iron sesquioxide, are liable to adulteration. Many samples, especially those which have been prepared at a high temperature, are with difficulty soluble in HCl. The following method is recommended for their examination. 0·5 Gm. of the sample is heated in a beaker with excess of HCl, and a few crystals of KI are added; the iron is rapidly dissolved, forming a solution of Fe_2Cl_6 with a little $FeCl_2$; the liquid is diluted with water and oxidized with bromine or HNO_3. The cooled liquid is then filtered [through a tared filter], the collected insoluble matter washed, dried and weighed. The iron in the bulked filtrate and washings is precipitated with ammonia, collected, ignited and weighed as Fe_2O_3 in the usual manner. In the filtrate, lime is then determined as oxalate, after the removal of which, and acidifying with HCl, the sulphuric acid present is precipitated and weighed as $BaSO_4$. Any carbonate present may be detected by the effervescence it occasions with acid. In addition to the above impurities, the loss on heating a portion of the sample should be determined, due to possible presence of H_2O and CO_2.

Conine and Nicotine, Distinctive Reactions of. C. Reichard. (*Pharm. Centralh.*, **46,** 252.) A few drops of palladium chloride solution are spread out over the surface of a porcelain capsule and allowed to dry spontaneously. On adding a trace of nicotine or conine to the brown spot thus produced, no change is observed ; but if the further addition of a trace of hydrochloric acid be made, in the presence of conine, a white turbidity at once appears and a crystalline mass is speedily formed. A pale green colour appears on the edges of the spot, which persists for some hours. The whole spot becomes lighter. If allowed to stand in a damp atmosphere, the green edge becomes yellowish and the crystals of palladium chloride reappear. Nicotine gives no such turbidity on first adding it to the palladium chloride solution ; and no formation of a crystalline mass takes place. On standing in a moist atmosphere a pale green liquid is formed, which forms a marked contrast to the colour of the rest of the palladium residue. If the bases or their anhydrous salts be added to a few particles of finely powdered anhydrous copper sulphate, the whole mass is coloured deep blue by conine, while with nicotine the whitish powder remains unaltered. If the salts of the alkaloids contain water, the colour takes longer to develop with conine. The tint given by conine resembles that of ammoniocupric sulphate, and the base is entirely absorbed, forming a dark blue crystalline mass. With nicotine, the copper sulphate powder shows no change, even after standing for 24 hours.

Conium maculatum, Essential Oil of. (*Haensel's Report, July,* **1904,** through *Apoth. Zeit.*, **19,** 558.) *Essential Oil of Conium Herb.*—The herb, without flowers, yielded 0·0765 to 0·0783 per cent. of dark brown, unpleasant smelling oil, with an acid reaction ; sp. gr. at 15°C., 0·9502 ; acid value about 60 ; saponification value about 70. It deposits a solid stearoptene at low temperatures. When rectified with steam, only about 25 per cent. distils ; the blackish residue solidifies on cooling. The rectified oil is brownish, acid in reaction, and has nearly the same odour as the crude product. Its sp. gr. at 20°C. is 0·9310 ; it dissolves readily in alcohol (90 per cent.), and in about 70 parts of alcohol (80 per cent.). It contains free palmitic acid.

Essential Oil of Conium Fruits. The fruits only yield 0·0179 per cent. of blackish-brown evil-smelling oil of neutral reaction. Sp. gr. at 15°C., 0·8949 ; saponification value, 34. On rectifying with steam 51 per cent. distils over as a greenish-yellow oil; sp. gr. at 15°C., 0·8313; $[\alpha]_D -2{\cdot}16°$.

Copaiba Balsam, Surinam. L. van Itallie. (*Journ. Pharm. Chim.* [6], **20,** 337.) Seven authentic specimens of Surinam copaiba "balsam" varied in colour from pale yellow to yellowish brown; one had a greenish tinge; two had no fluorescence, the rest showed this character in a slight degree. In consistence they varied from syrupy to liquid. The sp. gr. ranged from 0·9535 to 0·9611; acid value, from 14·65 to 59·19; saponification value, from 25·2 to 75·8; percentage of essential oil, from 41 to 71·6 per cent. The "balsams" evidently belonged to two types, one thick, the other very fluid.

Surinam copaiba is distinguished from Para and Maracaibo "balsam" by its relative insolubility in alcohol 90 per cent. A characteristic blue colour reaction is obtained on adding a small drop of H_2SO_4 to a solution of one drop of the copaiba in 1 c.c. of anhydrous acetic acid.

The essential oil was found to contain a sesquiterpene alcohol, which crystallized in the condenser towards the end of the distillation of the oleoresin with steam. This had the m.p. 113·5–115°C. and the formula $C_{15}H_{25}OH$. It begins to sublime at 80°, and is optically inactive. This body is evidently closely related to the metacopaivic acid of Keto and the metacholestol of Mach, Tschirch and Weil. It is only partially acetylized when heated in pyridine solution with acetic anhydride. The liquid portion of the oil was found to contain a little cadinene and at least two sesquiterpenes.

Copaiba Balsams. (*Schimmel's Report, May,* **1905,** 24.) Twenty-four authentic specimens of Pará, Bahia and Angostura copaiba were found to have the following characters:—

Pará Balsam. Sp. gr. at 15°C., 0·9692; $[\alpha]_D$ −41° 20′; $[\eta]_D$ 1·51425; acid value, 60·75; saponification number, 64·72.

Bahia Balsam. Sp. gr. at 15°C., 0·9603; $[\alpha]_D$ +0°18′; $[\eta]_D$ 1·50693; acid number, 57·9; saponification number, 67·4.

Angostura Balsam. Sp. gr. at 15°C., 0·9882; $[\alpha]_D$ +26° 15′; $[\eta]_D$ 1·51603; acid number, 86·54; saponification number, 96·41. The above saponification values were obtained by the Dieterich (cold) titration method. With hot saponification as official in the Ph. G. IV. test, slightly lower figures were obtained.

Essential Oils. The *Pará Balsam* yielded 62·5 per cent of oil; sp. gr. 0·918; $[\alpha]_D$ −78° 48′. *Bahia Balsam* gave 61·9 per cent. of oil; sp. gr. 0·8982; $[\alpha]_D$ −9° 37′. *Angostura Balsam* yielded 52·3 per cent. of faintly greenish oil; sp. gr. 0·9161; $[\alpha]_D$ −2°20′.

Copper Sulphate for the Purification of Water Supplies. G. T. Moore. (*Amer. Journ. Pharm.*, **76,** 553, 579.) Copper sulphate in the proportion of 1 : 5,000,000 or even 1 : 8,500,000 has been found practically efficient on the large scale for destroying algæ and confervoid growth, which frequently impart a disgusting taste and odour to the water in reservoirs during the hot weather of summer. In the United States the frequency of this growth has proved a serious matter in the case of many public water supplies. The algæ appear suddenly, develop with great rapidity, and impart to the water so marked a taste and odour that it becomes unfit for use. The bluish-green forms are stated to be specially troublesome in this respect, since they secrete what is considered to be a volatile oil, a very minute trace of which is sufficient to taint an immense volume of water. Instances are given in which reservoirs of water rendered undrinkable by the presence of these algæ were completely cleared in four days by treatment with copper sulphate in the proportion indicated, and the water was rendered pure and drinkable. Not only does the treatment destroy the algæ and prevent their reappearance, but it also greatly lessens the number of other micro-organisms in the water. It is claimed that, in this proportion, copper sulphate is absolutely harmless to the consumers of the water, an opinion which is supported by prominent therapeutists.

[This method has proved most serviceable in destroying an abundant and troublesome confervoid growth which forms during hot weather in the large water reservoirs of a chemical factory in London. Its efficacy in this direction renders it worthy of adoption for the removal of vegetable growths in such situations, especially where the water is merely used solely for condensers or coolers.—Editor, *Year-Book.*]

Corydalis cava and C. solida Herb, New Alkaloids from. J. Gadamer and O. Haars. (*Archiv der Pharm.*, **243,** 154.) In addition to the bases of the corydaline group and bulbocapnine, previously found in the roots or rhizomes of *Corydalis*, the aerial portions of the herb are found to contain two new bases. One, $C_{21}H_{21}NO_8$, forms small white crystals, m.p. 230°C.; it is lævorotatory $[\alpha]^{20}_{D} -112{\cdot}8^{\circ}$, whereas all the other corydalis alkaloids hitherto isolated have been dextrorotatory. The other new base, $C_{21}H_{23}NO_7$, was isolated from the mother liquors of the preceding base; it has the $[\alpha]^{20}_{D}$ $+115{\cdot}5^{\circ}$. The authors could not detect protopine in the aerial portions of *Corydalis cava*.

Cream of Tartar, Adulterated. E. J. Millard. (*Chem. and Drugg.*, **65**, 399.) The sample of cream of tartar examined was not perfectly soluble in water even when heated, and was found to contain a considerable proportion of maize starch, readily recognizable by the usual tests. One Gm. required only 4·1 c.c. of the volumetric solution of caustic soda for neutralization, and a corresponding reduction occurred in the quantity of acid required to neutralize the soluble ash. A minute quantity with a drop of iodine water on a glass slide showed the starch grains very distinctly under the microscope.

Cupric Sulphate, Detection of Ferrous Sulphate in.—Crouzel. (*Annales de Chim. Analyt.*, **9**, 422.) On mixing equal volumes of 10 per cent. solutions of the cupric sulphate to be tested, and of sodium thiosulphate, if the copper salt be pure, a bright green precipitate slightly tinted with yellow is obtained, in 24 hours this will have become bright yellow, and the sides of the tube will be dotted with crystals of cupric-sodium hyposulphite or Lenz's salt. If iron be present as an impurity, the precipitate will be partly ochre yellow. By adding the thiosulphate in excess to the copper solution, so that the precipitate is redissolved and a colourless liquid obtained, and then adding K_4FeCy_6 solution, an immediate pale blue precipitate results in the presence of iron, while if zinc be present a white flocculent precipitate is formed.

Cypress, Essential Oil of, Constituents of. (*Schimmel's Report, October*, **1904**, 22.) *German distilled cypress oil* is found to contain furfural, dextropinene; dextro-camphene; dextro-sylvestrene; cymene; a ketone; possibly sabinol; a terpene alcohol(?) dextroterpineol; an ester, probably an acetate; valerianic acid; lævocadinene; a sesquiterpene alcohol, cypress camphor, and a body with an odour resembling ladanum. The original oil had the sp. gr. 0·8916 at 15°C.; $[a]_D + 16° 27'$; acid value, 1·88; ester value, 19·53; acetyl value, 48·48; solubility in alcohol 90 per cent., 1 : 2·5. A *French distilled oil* was found to have the sp. gr. 0·8680 at 15·5°C.; $[a]_D + 26° 13'$; ester value, 5·31; acetyl value, 10·25; solubility in alcohol 90 per cent., 1 : 5·5 and more. The value of the oil as a remedy for whooping cough is confirmed. (See also *Year-Book*, **1904**, 76, 201.)

Diphenylcarbacide as a Reagent for Molybdenum. E. Lecocq. (*Bull. Assoc. Belge de Chim.*, through *Merck's Report*, **18**, 59.) By the addition of 1 or 2 drops of an alcoholic solution of diphenylcarbacide to a solution of ammonium molybdate acidified with HCl a fine indigo violet colour reaction is produced, and, with more of the reagent, a precipitate of the same colour. By this means the presence of 0·00007 per cent. of ammonium molybdate is said to be detectable.

The reaction is not obtained with aqueous solution of diphenyl carbacide, nor does it occur with a benzol solution, but the latter reacts with copper. Tungsten, titanium and vanadium give no colour reaction.

Elder Flowers, Stearoptene of the Essential Oil of. (*Haensel's Report, April*, **1905**, 7.) The odourless stearoptene of elder-flower oil, which is sparingly soluble in absolute alcohol, consists of a mixture of palmitic acid and hydrocarbons; the latter consist chiefly of tricosan, $C_{23}H_{48}$.

Elemis, Summary of the Investigation of. A. Tschirch and O. Saal. (*Archiv der Pharm.*, **242**, 366.) The authors thus summarize in tabular form the constituents isolated in the investigation of the various elemis:—

Name.	Amyrin.	Resin Acids			Bryoidin	Resene.	Essential Oil.
Manila-Elemi (soft)	Manamyrin $C_{30}H_{50}O$ 20–25%	α-Manelemisic acid $C_{37}H_{56}O_4$ 5–6%	β-Manelemisic Acid $C_{44}H_{80}O_4$ 8–10%	—	Bryoidin $C_{21}H_{42}O_3$ 0·8–1%	Maneleresene $C_{15}H_{30}O$ 30–35%	20–25%
Manila-Elemi (hard)	Manamyrin $C_{30}H_{50}O$ 25–30%	α-Manelemisic acid $C_{37}H_{56}O_4$ 8–9%	β-Manelemisic acid 6–8%	—	Bryoidin $C_{21}H_{42}O_3$ 1·0–1·5%	Yuceleresene	7–8%
Yucatan-Elemi	Yucamyrin $C_{30}H_{50}O$ 10–15%	—	—	—	—	Yuceleresene $C_{23}H_{44}O$ 60–70%	8–10%
African Elemi	Afamyrin $C_{30}H_{50}O$ 20–25%	—	Afelemisic acid $C_{44}H_{90}O_4$ 8–10%	—	—	Afeleresene $C_{15}H_{24}O$ 40–50%	15–20%
Protium (Almessega)-Elemi	Protamyrin $C_{30}H_{50}O$ 30%	—	—	Protelemisic acid 45%	—	Proteleresene 35–40%	—
Caricari-Elemi	Cariamyrin $C_{30}H_{50}O$ 3%	Isocarieleminsic acid $C_{39}H_{56}O_4$ 5%	Carieleminsic acid $C_{39}H_{56}O_4$ 12%	Carielemisic acid $C_{37}H_{56}O_4$ 20%	—	Carieleresene $C_{24}H_{46}O_2$ 40%	3%
Carana-Elemi	Caramyrin $C_{30}H_{50}O$ 20–25%	Isocareleminsic acid $C_{39}H_{56}O_4$ 2%	Careleminsic acid $C_{39}H_{56}O_4$ 8%	Carelemisic acid $C_{37}H_{56}O_4$ 10%	—	Careleresene $C_{15}H_{24}O$ 30–35%	10%
Colophonia-Elemi	Colamyrin $C_{30}H_{50}O$ 25–30%	α-Isocolelemisic acid $C_{37}H_{56}O_4$ 10%	Coleminsic acid $C_{39}H_{56}O_4$ 3%	β-Isocolelemisic acid $C_{37}H_{56}O_4$ 7%	Bryoidin $C_{21}H_{42}O_3$ ½%	Coleleresene $C_{15}H_{24}O$ 30–35%	3%
Tacahamaca-Elemi	Tacamyrin $C_{30}H_{50}O$ 30–35%	α-Isotacelemisic acid $C_{37}H_{56}O_4$ 2%	Tacelemisic acid $C_{37}H_{56}O_4$ 2%	-Isotacelemisic acid $C_{37}H_{56}O_4$ 3%	—	Taceleresene $C_{15}H_{24}O$ 30–35%	2%

Of the acids, α-manelemisic acid and tacelemisic acid have the formula $C_{37}H_{56}O_4$ and the m.p. 215°C. Carielemine acid, coleleminic acid, and careleminic acid have the same m.p. 215°C. as this, but the formula $C_{39}H_{56}O_4$.

The following all have the formula $C_{37}H_{56}O_4$ and the m.p. 120–122°C. : α-iso-colelemic, β-iso-colelemisic α-iso-tacelemisic, β-iso-tacelemisic, carelemisic and carielemisic acids

Afolemisic acid stands alone with the formula $C_{44}H_{90}O_4$ and the m.p. 97–98°C.

The following melt at about 75°C. : β-manelemic acid, $C_{44}H_{80}O_4$; also isocarieleminic and isocarelemic acids, with the common formula $C_{39}H_{56}O_4$.

Eucalyptus, Essential Oil of, adulterated with Castor Oil. C. T. Bennett. (*Chem. and Drug.*, **66,** 33.) Specimens of oil, which answered the official characters and tests, were suspected on account of their high sp. gr., 0·917 to 0·919, and low cineol content, 38 to 45 per cent. When submitted to fractional distillation under reduced pressure, an oily residue was obtained which was identified as castor oil. One sample of the oil contained nearly 20 per cent., others from 12 to 15 per cent.

Eucalyptus, Oils of [Constituents of Essential Oils of Various Species]. R. T. Baker and H. G. Smith. (*Schimmel's Report, Oct.*, **1904,** 31–37.) The authors have summarized in tabular form the results of their investigation of the essential oils of various species of Eucalyptus :—

Botanical Name	Vernacular Name	Geographical Origin	Average percentage of Oil.	Principal Chemical Constituents
E. tessellaris F. v. M.	Moreton Bay, Ash	Narrabri, N.S.W.	0·151	Pinene, sesquiterpene.
E. trachyphloia F. v. M.	Bloodwood	Murrumbo N.S.W.	0·199	Pinene, sesquiterpene.
E. eximia R. T. B.	White Bloodwood	Springwood N.S.W.	0·462	Pinene.
E. botryoides Sm.	Bastard Mahogany	Milton, N.S.W.	0·086	d-Pinene.
E. robusta Sm.	Swamp Mahogany	La Perouse, N.S.W.	0·161	Pinene.

Botanical Name.	Vernacular Name.	Geographical Origin.	Average percentage of Oil.	Principal Chemical Constituents.
E. saligna Sm.	Blue Gum	Gosford, N.S.W.	0·241	Pinene.
E. nova-anglica D. & M.	Black Peppermint	Walcha, N.S.W.	0·51	Terpenes.
E. umbra R. T. B.	A Stringy-bark	Lismore, N.S.W.	0·1615	Pinene, also an acetic acid ester.
E. dextropinea R. T. B.	Stringybark	Barber's Creek, N.S.W.	0·798	d-Pinene.
E. wilkinsoniana R. T. B.	Small Leaved Stringybark	Barber's Creek, N.S.W.	1·01	l-Pinene.
E. laevopinea R. T. B.	Silver Top Stringybark.	Rylstone, N.S.W.	0·66	l-Pinene.
E. Bauerleni F. v. M.	Brown Gum	Monga, N.S.W	0·328	Terpenes, cineol, chiefly the former
E. propinqua D. & M.	Grey Gum	Woodburn, N.S.W.	0·235	
E. affinis D. & M.	Black Box	Grenfell, N.S.W.	0·259	
E. paludosa R. T. B.	Swamp Gum	Barber's Creek, N. S.W.	0·197	
E. lactea R. T. B.	Spotted Gum	Ilford, N.S.W.	0·557	Terpenes
E. intertexta R. T. B.	Gum or Red Gum	Nyngan, N.S.W.	0·395	Pinene, cineol.
E. maculata Hook	Spotted Gum	Currawang Creek, N.S.W.	0·169	Pinene, cineol, chiefly the former.
E. quadrangulata D. & M.	Grey Box	Milton, N.S.W.	0·684	Pinene, cineol.
E. conica D. & M.	Box	Parkes, N.S.W.	0·587	Pinene, cineol.
E. bosistoana F. v. M.	Box	Barber's Creek, N.S.W.	0·968	Pinene, cineol, chiefly the former.
E. eugenioides Sieb	White Stringybark	Canterbury, N.S.W.	0·742	Terpenes, cineol.
E. resinifera Sm.	Mahogany	Gosford, N.S.W.	0·302	Pinene, cineol.
E. polyanthema Sieb	Red Box	Pambula, N.S.W.	0·825	
E. behriana F. v. M.	Mallee Gum	Wyalong, N.S.W.	0·614	

Botanical Name.	Vernacular Name	Geographical Origin	Average percentage of Oil	Principal Chemical Constituents.
E. rossi R.T.B. and H. G. S.	White or Brittle Gum	Bathurst, N.S.W.	0·65	Pinene, cineol, also piperitone.[1]
E. pendula A. Cunn.	Red Box	Nyngan, N.S.W.	0·67	Pinene, cineol, chiefly the latter.
E. dealbata A. Cunn	Cabbage or Mountain Gum	Condobolin, N.S.W.	0·856	Pinene, cineol, chiefly the latter.
E. rostrata Schl. *var. borealis* R. T. B. and H. G. S.	River Red Gum	Nyngan, N.S.W.	1·001	Pinene, cineol.
E. maculosa R. T. B.	Spotted Gum	Bungendore, N.S.W.	0·846	Pinene, cineol.
E. camphora R. T. B.	Sallow	Delegate, N.S.W.	0·836	Cineol.
E. punctata D. C.	Grey Gum	Canterbury, N.S.W.	0·781	Pinene, cineol.
E. squamosa, D. & M.	Ironwood	National Park, N.S.W.	0·643	Cineol
E. bridgesiana R. T. B.	Apple or Woollybutt.	Ilford, N.S.W.	0·619	
E. goniocalyx F. v. M.	Mountain Gum	Monga, N.S.W.	0·881	
E. bicolor A. Cunn.	Bastard Box	St. Mary's, N.S.W.	0·52	
E. viminalis, var. (a)	—	Crookwell, N.S.W.	0·701	Pinene, cineol, benzaldehyde?)
E. populifolia F. v. M.	Poplar Leaved Box	Nyngan, N.S.W.	0·758	Cineol.
E. longifolia Fink	Woollybutt	Canterbury, N.S.W.	0·535	
E. maideni F. v. M.	Blue Gum	Barber's Creek, N.S.W.	1·304	
E. globulus	Blue Gum	Jenolan, N.S.W.	0·745	
E. pulverulenta Sims	—	Bathurst, N.S.W.	2·22	
E. cinerea F. v. M.	Argyle Apple	Barber's Creek, N.S.W.	1·20	Cineol, some valeric ester.
E. cordata Labill	—	Tasmania	2·32	Cineol.

---

[1] With the name "piperitone' Baker and Smith designate a constituent with a peppermint-like odour, which is present in various eucalyptus oils.

Botanical Name	Vernacular Name.	Geographical Origin.	Average percentage of oil.	Principal Chemical Constituents
E. morrisii R. T. B.	Grey Mallee	Gorilambonet, N.S.W.	1·69	Cineol.
E. smithii R. T. B.	Gully Ash or White Top	Monga, N.S.W.	1·431	
E. sideroxylon A. Cunn.	Red Flowering Iron Bark	Liverpool, N.S.W.	0·537	Pinene, cineol.
E. cambagei D. & M.	Bastard Box or Bundy	Bathurst, N.S.W.	0·735	Cineol, some aromadendral.
E. polybractea R. T. B.	Blue Mallee	Wyalong, N.S.W.	0·135	Pinene, cineol, aromadendral.
E. dumosa A. Cunn.	White Mallee	Coolabah, N.S.W.	1·00	Terpenes, cineol, aromadendral.
E. oloesa F. v. M.	Red or Water Mallee	Nyngan, N.S.W.	0·97	Pinene, cineol, aromadendral.
E. cneorifolia D. C.	—	Kangaroo Island	—	Pinene, cineol, aromadendrol.
E. stricta Sieb.	Mountain Mallee	Blue Mountains N.S.W.	0·494	Cineol.
E. melliodora A. Cunn.	Yellow Box	Rylston, N.S.W.	0·676	Pinene, cineol, frequently phellandrene.
E. ovalifolia var. lanceolata R. T. B.	Red Box	Camboon, N.S.W.	0·579	Pinene, cineol, phellandrene.
E. risdoni Hook f.	Risdon or Drooping Gum	Tasmania	1·348	Cineol, phellandrene, piperitone.
E. punctata D. C. *var. didyma* R. T. B. & H. G. S.	—	Barber's Creek, N.S.W.	0·428	Pinene, cineol, aromadendral.
E. gracilis F. v. M.	A Mallee	Gunbar, N.S.W.	1·06	Terpenes, a small qty. aromadendral.
E. viridis R. T. B.	Green Mallee	Gerilambone and Nyngan, N.S.W.	0·449	Aromadendral.
E. albens, Mig.	White Box	Rylston, N.S.W.	0·101	
E. hemiphloia F. v. M.	Box	Belmore, N.S.W.	0·554	Pinene, cineol, aromadendral.
E. viminalis Labill	Manna Gum	Cadia, N.S.W.	0·354	Phellandrene, cineol.

Botanical Name.	Vernacular Name	Geographical Origin	Average percentage of Oil	Principal Chemical Constituents.
E. rostrata Sch.	Murray Red Gum	Alvury, N.S.W.	0·299	Chiefly terpenes; also cineol and aromadendral, sometimes phellandrene.
E. ovalifolia R. T. B.	-	Rylstone, N.S.W.	0·216	Pinene, cineol, phellandrene.
E. dawsoni R. T. B.	Slaty Gum	Bylong, N.S.W.	0·172	Phellandrene, sesquiterpene.
E. angophoroides R. T. B.	Apple Topped Box	Towrang, N.S.W.	0·185	Terpenes, among which phellandrene.
E. fastigata D. & M.	Cut Tail	Monga, N.S.W.	0·263	Pinene, phellandrene eudesmol.
E. macrorhyncha F. v. M.	Red Stringybark	Rylstone, N.S.W.	0·272	Terpenes, cineol, eudesmol.
E. capitellata Sm.	Brown Stringybark	Canterbury, N.S.W.	0·103	Terpenes, small quantities of cineol
E. nigra R. T. B.	Black Stringybark	Woodburn, N.S.W.	0·0295	Phellandrene
E. pilularis Sm.	Blackbutt	Belmore, N.S.W.	0·13	Terpenes, also an as yet unknown alcohol
E. acmenoides Sch.	White Mahogany	Lismore, N.S.W.	0·358	Terpenes, among which phellandrene.
E. fraxinoides H. D. & J. H. M.	White Ash	Monga, N.S.W.	0·985	Terepenes, chiefly phellandrene.
E. fletcheri R. T. B.	Lignum Vitæ or Box	Thirlmere, N.S.W.	0·352	
E. microtheca F. v. M.	Coolybah or Tangoon	Narrabri, N.S.W.	0·150	
E. hæmastoma Sm.	White or Scribbly Gum	Barber's Creek, N.S.W.	0·241	Phellandrene, sesquiterpene.
E. crebra F. v. M.	Narrow Leaved Ironbark	Rylstone, N.S.W.	0·159	Pinene, phellandrene, cineol.
E. piperita Sm.	The Sydney Peppermint	Gosford, N.S.W.	0·627	Pinene, phellandrene, cineol, eudesmol and piperitone.
E. amygdalina Labill.	Messmate	Moss Vale, N.S.W.	3·393	Phellandrene, cineol and piperitone.
E. vitrea R. T. B.	White Top Messmate	Crookwell, N.S.W.	1·48	Phellandrene, cineol.
E. luehmanniana F. v. M.	—	National Park, N.S.W.	0·289	Phellandrene.

Botanical Name.	Vernacular Name.	Geographical Origin.	Average percentage of Oil.	Principal Chemical Constituents.
E. coriacea A. Cunn.	Cabbage Gum	Ilford, N.S.W.	0·452	Phellandrene, piperitone.
E. sieberiana F. v. M.	Mountain Ash	Barber's Creek, N.S.W.	0·421	Phellandrene, piperitone.
E. oreades R. T. B.	A Mountain Ash	Lawson, N.S.W.	1·16	
E. dives Sch.	Broad Leaved Peppermint	Fagan's Creek, N.S.W.	2·233	
E. radiata Sieb.	White Top Peppermint	Monga, N.S.W.	1·641	
E. delegatensis R. T. B.	White Ash, Silver Top Mountain, Ash	Delegate, Mountain, N.S.W.	1·76	
E. obliqua L'Hér.	Stringybark	Monga, N.S.W.	0·677	Phellandrene, a small quantity aromadendral.
E. stellulata Sieb.	Lead Gum	Rylstone, N.S.W.	0·293	Phellandrene.
E. macarthuri H. D. and J. H. M.	Paddy River Box	Wingello, N.S.W.	0·112	Geranyl acetate.
E. virgata Sieb.	—	Springwood, N.S.W.	0·283	Eudesmol.
E. patentinervis R. T. B.	Mahogany	Belmore, N.S.W.	0·254	Terpenes, citral and an as yet unknown alcohol.
E. apiculata R. T. B. and H. G. S.	—	Berrima, N.S.W.	0·296	Terpenes, piperitone.
E. citriodora Hook.	Citron Scented Gum	Sydney N.S.W.	0·586	Citronellal.

Eucalyptus occidentalis Bark (Mallet Bark). E. M. Holmes. (*Pharm. Journ.* [4], **20**, 141.) Specimens of this bark and of the powdered form in which it is prepared for commercial use have recently been presented to the Museum of the Pharmaceutical Society by P. Appleyard, of Albany, W. Australia. During the last few years this bark has attracted considerable attention as a tanning material, which it is believed will rival "mimosa" bark in utility, whilst it may be produced at a cheaper rate.

There seems to have been some ignorance concerning its botanical source, since in *Der Gerber*, xxx. 349 it is referred to the *Jasminum sambac*, N.O. Oleaceæ, an error which has probably arisen from the assumption that the Australian name is a corruption of the name given to that climber in the Straits Settlements, viz., "Malati" or "Melati," and from an imperfect acquaintance with the microscopical characters of the barks of different natural orders of plants. Appleyard has set any doubts at rest, since he has sent dried flowering specimens of the plant from which the bark is derived, for the Herbarium of the Society. These certainly belong, as he points out, to the *Eucalyptus occidentalis*, Endl., the local or vernacular name of which, in Albany, is the mallet tree.

The bark has hitherto been chiefly exported from Fremantle, W. Australia, and previously to the present year to the extent of about 500 to 600 tons per annum. During the present year, according to *Der Gerber*, the export has reached 4,000 to 5,000 tons. Appleyard states that during the present year about 50,000 tons have been collected and dried. The bark is in quilled pieces several inches long, dark greyish-brown externally, but of a pale buff brown tint where broken. The fracture is very short, slightly laminated, and the taste astringent. The thin grey periderm easily scales off. The periderm is in many pieces abundantly covered with small circular depressed warts mostly perforated in the centre, which appear to have been formed by some insect. The bark, judging from its thickness, which is on the average about 5 to 6 mm., is probably derived from comparatively young trunks. From some specimens of mallet bark received from H. R. Procter, of Leeds, it is evident that some of the bark hitherto imported under this name has been derived from other species of *Eucalyptus*, his specimen being much more fibrous in character, of a darker brown colour, and not having a defoliating periderm. A West Australian bark, named morrelbark, containing, according to Procter's analysis, 44 per cent. of tanning matter, approaches sufficiently near in character to the mallet bark to indicate that it belongs to a nearly allied species of *Eucalyptus*.

The analyses of the bark given in *Der Gerber* indicate the following percentages of tannin available for leather manufacture, viz. young bark, 35 per cent.; medium bark, 40 to 50 per cent.; old bark, 39 to 70 per cent.; giving an average of about 38 per cent. Appleyard, however, gives 30 per cent. only as the average of the bark sent by him. A specimen of the powdered bark sent by him and analysed by H. R. Procter gave tanning matter absorbed by hide, 54·5 per cent.; soluble nontanning matter, 8·0; matter insoluble in water at 15°C., 25·3 per cent., and 11·6 per cent. water. The tintometer colour measurement of solution containing 0·5 per cent. of tanning matter in 1 cm. cell is given as red 3·0, yellow 8·6. Procter adds that there is no question that "it is one of the strongest natural tanning materials we have had through our hands."

The tanning matter when extracted has a cinnamon-brown colour. It is said to act quickly and easily, and to tan fully. But there appears to be some doubt as to the best method of using it, since one Australian tanner states that it requires to be used like valonia in conjunction with other tanning materials, for if used alone it makes a hard thin leather that becomes very brittle. The fact, however, that the demand for the bark has increased so rapidly since its introduction indicates that if used in proper proportions and under suitable conditions it is a valuable tanning material. As the bark is easily powdered and the powder easily exhausted of its tannin by cold water and the leather produced by it is of a pale colour, it evidently possesses considerable advantages, and if it can be produced at a cheaper rate than mimosa bark, may become a strong competitor of that widely-used tanning material.

Eucalyptus polybractea, Essential Oil of. J. C. Umney and C. T. Bennett. (*Pharm. Journ.* [4], **20, 143**.) An authentic specimen of the oil from New South Wales had the following characters. Sp. gr. 0·929; Cineol percentage as determined by Scammell's process, 79 to 80; [*a*] +0. The oil was absolutely free from any irritating odour, due to the absence of aldehydes, and is very rich in cineol.

As a rule, with oils of very high eucalyptol value there is an association of cuminic aldehyde, but in this particular case there is practically none present, as indicated by odour and behaviour of the oil with sodium acid sulphite, although a slight reaction for an aldehyde was obtained with Schiff's reagent. Judged by its cineol content, the oil of this species appears to be of very highest medicinal value—not even second to the oil of *Eucalyptus globulus.*

Fagara octandra, Essential Oil of. (*Schimmel's Report, May,* **1905,** 82.) The oil from the wood of this Mexican tree is bright yellow in colour and has the odour of linalol. Sp. gr. at 15°C., 0·922, [a] +2° 30′; ester value, 6·09; solubility in alcohol, 90 per cent., 2 : 1 cloudy on adding more solvent.

Ferric Chloride Solution, Volumetric Titration of.—Moreau (*Bull. Soc. Pharm.*, through *Annales de Chim. Analyt.*, **9,** 264.) The method is based on the equation—

$$Fe_2Cl_6 + 2Na_2S_2O_3 = Na_2S_4O_6 + 2NaCl + 2FeCl_2,$$

and the fact that only ferric salts give a violet colour with salicylates. The above reaction does not occur on simple admixture except on boiling, but in the presence of a few drops of $CuSO_4$ the reduction takes place at once, in the cold.

Five Gm. of the solution to be tested is weighed off, treated with about 2 c.c. of pure HCl, and made up to exactly 80 c.c. with distilled water. Ten c.c. of this is taken, diluted with 20 to 30 c.c. of distilled water, 0·10 Gm of sodium salicylate dissolved in a little water is added, then 10 drops of 10 per cent. $CuSO_4$ solution. The mixture is then titrated with N/10 $Na_2S_2O_3$ until the violet colour disappears, and the blue of the $CuSO_4$ is evident. Each 0·1 c.c. of N/10 $Na_2S_2O_3$ used indicates the amount per cent. of Fe_2Cl_6 present in the original solution.

Ferrous and Ferric Arsenates. W. Duncan. (*Pharm. Journ.* [4], **20,** 71.) In view of the unstable nature of the official ferrous arsenate it is proposed to substitute for it the more stable ferric salt, since the compound is generally prescribed, not for its iron content, but as a means of administering arsenic.

Ferric arsenate was prepared from ferric sulphate. The freshly precipitated salt is dull white, insoluble, and becomes greyish on drying in a water-bath, but if heated above 100°C. tends to redden.

Analysis of the air-dried salt gave the formula $FeAsO_4H_2O$. of the water-bath dried salt $FeAsO_4$. The hydrated salt is readily soluble in ammonia, the anhydrous slowly, but, in time, completely. Both effervesce with alkali bicarbonate and form water-soluble compounds, from which ferric arsenate can be reprecipitated by the addition of acids. Hydrated ferric arsenate is therefore an acid, which explains the effervesence that follows when oxidized ferrous arsenate is added to a bicarbonate.

To determine its basicity a weighed quantity was dissolved in excess of ammonia, and the excess determined by N/10 H_2SO_4.

0·25 Gm. ferric arsenate combined with 0·045 Gm. NH_3. An acid corresponding to the formula $H_2FeOAsO_4$ would require 0·040 NH_3 to form the salt $(NH_4)_2FeOAsO_4$. 2·0 Gm. combined with 0·33 NH_3. An acid corresponding to the above formula would require 0·33 NH_3 for saturation. The alkali combinations are not very stable, and decompose on largely diluting with water. If a strong neutral solution of the ammonia salt be added to ferrous sulphate an insoluble salt veiy similar in colour to commercial ferrous arsenate is produced, but it does not cause effervescence with potassium bicarbonate, and when added to alkali hydroxides decomposes and precipitates ferrous hydroxide. It is apparently ferrous ferri-arsenate $FeFeOAsO_4$. Hydrated ferric arsenate is analogous to ferric citrate—a dibasic acid, or tribasic arsenic acid with one of the hydrogens replaced by ferryl FeO. That is $AsO_2FeO(OH)_2$.

The properties of ferric arsenate throw some light on the decomposition of ferrous arsenate. It is probable that the combined action of air, moisture, and heat causes a partial change into ferrous ferric arsenate and ferric arsenate which might be expressed by the following equation :—

$$Fe_32AsO_4 + O + H_2O = FeFeOAsO_4 + FeAsO_4H_2O.$$

The ferrous ferric arsenate further undergoes hydrolysis into ferrous hydroxide and ferric arsenate, the hydroxide finally passing into ferric oxide.

The present quantitative test for ferrous arsenate—percentage of ferrous iron—has been repeatedly condemned. Records for the past twenty years show variations from 4·5 to 14 per cent. of ferrous arsenate, the average lying between 10 and 12 per cent. One (a twenty-year-old sample) contained merely traces of ferrous iron, while another recent sample contained over 25 per cent. Nicholls (*Year-Book*, **1903,** 572) found in twenty-eight samples a range from 5·78 to 32·84 per cent., and total arsenic 25·39 to 30·85 per cent.

It has been suggested to make the arsenic content the standard for the salt. This merely shifts the difficulty, for the arsenic content must be a variable quantity, though not to the same extent as the ferrous iron. Experiments are being conducted with ferrous-ammonium arsenate.

Ferrum redactum. F. H. Alcock. (*Pharm. Journ.* [4], **19,** 852.) Since the demand for reduced iron free from heavy arsenical contamination has arisen, commercial specimens have been met with containing but little arsenic, but these have left an insoluble residue when treated with HCl, one specimen giving 2·75 and another 7·5 per cent. of apparently siliceous matter insoluble in the acid.

Fir Oil, Siberian. J. Schindelmeiser. (*Apoth. Zeit.*, **19,** 815.) *Essential Oil of Siberian Fir.*—The following constants are given for pure essential oil of Siberian fir : $[\alpha]_D$ at 17°C. not under −39° - 40°, sp. gr. at 17°C. not under 0·918. Ester value 35 42 per cent. as bornyl acetate. Examination of commercial samples showed them to range in sp. gr. from 0·911 to 0·915 at 17°C. ; $[\alpha]_D$ −29° 18′ to 34° 30′; they gave from 22 to 30 per cent. of a fraction boiling between 170°–190°C., and in the higher boiling fraction 22–30 per cent. of bornyl acetate. The rotation of the 170°-190°C. fraction was not over −34° at 17°C. From this fraction a portion boiling between 174°–180°C. was isolated, having the low rotation −18° 28′ at 17°C. It is evident, therefore, that the commercial samples are adulterated with the cheaper pine needle oil or oil of turpentine. The ester content of pure Siberian fir oil never falls below the equivalent of 35 per cent. of bornyl acetate.

Flowers of Sulphur and Sublimed Sulphur. A. Domergue. (*Annales de Chim. Analyt.*, **9,** 445.) Both in works of reference and in commerce the terms flowers of sulphur and sublimed sulphur appear to be very loosely applied. The author proposes to limit the term " flowers of sulphur " to the product of sublimation, which contains not less than 33 per cent. of the utricular modification which is insoluble in CS_2, whereas the crystalline modification is readily soluble. During the process of sublimation the product at first formed by the sudden condensation of the sulphur vapour in the cold air of the sublimation chamber is the utricular, amorphous, insoluble sulphur. But as the temperature rises, more and more crystalline sublimate is formed ; and near the aperture of the retort this is even melted, to recongeal later. In consequence the contents of the chamber when the process is completed is far from being homogeneous, consisting of amorphous sulphur mixed with fine crystals, spongy crystalline masses, and heavy compact blocks of fused sulphur. Since for certain technical purposes the amorphous insoluble form is more valuable, sulphur, which contains the higher percentage, commands a higher price. The standard and nomenclature suggested would seem, therefore, to be desirable.

Formaldehyde, a Product of Combustion of Organic Matter and its Presence in the Atmosphere of Towns. A. Trillat. (*Bull. Soc. Chim.* [3], **33,** 386 and 393.) It has previously been shown that formaldehyde is a constant constituent of the products of combustion of organic matter (*Year-Book*, **1904, 91**). It is now found that the amount produced from any given fuel is greatly modified by the nature of the furnace, the temperature of burning, and other conditions. When the walls of the furnace are composed of metal, the amount of formaldehyde formed is much greater than when this is not the case. Soot is found to contain notable quantities from 0·28 to 0·35 per cent.; cigar smoke yielded from 0·063 to 0·118 per cent. on the weight of tobacco burnt, and tobacco smoke similar quantities; but in tobacco smoke it does not occur in a free state, so that it does not cause irritation when inhaled. In other smoke, on the contrary, it occurs uncombined. Sugar and vegetable tissue rich in saccharine matter, also incense, yield very large quantities of formaldehyde when burned, from 4·5 to 5·76 per cent. on the weight of the material. It is suggested, therefore, that burning sugar might under certain circumstances form a useful method of disinfection, and indicated that the ancient method of purifying the air by means of fires and burning aromatic spices was not without sound justification. In the same manner the preserving and hardening effect of wood smoke on the familiar smoked meats is explained. In consequence it was to be expected that the atmosphere of towns would be found to contain formaldehyde. In Paris, this was found to be so, 100 cubic metres of air taken on the roof of a house yielding 17 to 24 Mgm.; that taken from the upper floors 25 to 31 Mgm.; and a sample from the industrial suburb of Courbevoie 25 to 55 Mgm. A. Levy and Henriet have found that pure air taken at the seaside is free from a trace of formaldehyde. It is evident, therefore, that its presence is due to the products of combustion in the air. It is calculated that, presuming 3,000,000 tons of combustible matter is consumed per annum in Paris, no less than 1,000,000 kilos of formaldehyde is produced; but, when once the smoke produced is dispersed in the air, the formaldehyde becomes so diluted that its presence can have no appreciable physiological result. A ready test of the presence of formaldehyde in the atmosphere is afforded by filter paper impregnated with aqueous solution of neutral rosaniline hydrochloride, and dried. When such test paper is exposed to air containing formaldehyde the violet red colour ultimately changes to blue. In the air of Paris this takes place in a few hours.

Formaldehyde, Colorimetric Method for the Detection and Estimation of. F. Bonnet, jr. (*Journ. Amer. Chem. Soc.*, 27, 601.) If a substance containing formaldehyde is placed in an evaporating dish, and 1 c.c. of a freshly-prepared sulphuric acid solution of morphine in a watch-glass, or a small porcelain crucible is floated upon it, the morphine solution becomes more or less coloured, varying from pink to dark blue, according to the amount of formaldehyde present. The coloration is due to the vapour of the formaldehyde, which reacts with the morphine By this method so small an amount as 4 parts of formaldehyde in 1,000,000 can be detected.

The morphine sulphate solution is made by dissolving 0·35 Gm. of white crystalline morphine sulphate in 100 c.c. of cold, strong, chemically pure sulphuric acid (sp. gr. 1·84). Unfortunately, this solution does not keep any great length of time, as the sulphuric acid slowly decomposes the morphine, even at ordinary temperatures. The following tests should be made, therefore, with fresh solutions.

Quantitative Estimation. Experiments to determine whether the foregoing test could be applied quantitatively were made as follows :—

A standard solution of milk was made by dissolving 11 c.c. of a Kahlbaum solution containing 34 per cent. by weight of formaldehyde in 100 c.c. of milk, giving a solution of 4 : 100. From this, solutions containing 8 : 1,000, 4 : 1,000 ; 8 : 10,000, 4 : 10,000 ; 8 : 100,000, 4 : 100,000 ; 8 : 1,000,000, and 4 : 1,000,000 were made by adding the required amount of milk.

Samples of milk containing varying amounts of formaldehyde were then prepared, the amount in each being unknown, for the time being, to the experimenter. Sixty c.c. of each of these samples were placed in evaporating dishes and tested as in the qualitative trials. The approximate time of the first ring or colour formation gave an idea of the amount of formaldehyde present. Knowing approximately the amount of formaldehyde in solution. fresh portions of the unknown milk were compared with the corresponding standard solutions, care being taken that the tests were started at the same time and were made under like conditions.

In each of the above prepared unknown samples the amount of formaldehyde found was essentially the same as that which had been put into the solution. Over a range extending from 8 : 1,000 to 8 : 1,000,000, solutions containing the same amounts of formaldehyde gave the same characteristic coloration in the same period of time. It is necessary for accurate work that equal amounts of the unknown and known solutions be taken, and that the amounts of the morphine solution used should be the same ; also the evaporating dishes and the watch-glasses should be alike both in size and shape.

Formaldehyde, Determination of. W. Fresenius and L. Gruenhut. (*Zeits. für Analyt. Chem.*, through *Annales de Chim. Analyt.*, **10,** 162.) The two following methods, the first a modification of that of Blank and Finkenbeiner, the second that of Romyn, are selected as being most suitable for assaying commercial formalin.

Hydrogen peroxide method. The process depends on the reactions—

(*a*) $HCOH + NaOH + H_2O_2 = HCOONa + 2H_2O$,
(*b*) $2HCOH + 2NaOH + H_2O_2 = 2HCOONa + 2H_2O$.

Three Gm. of the formalin are weighed off in a closed weighing tube, and added to 25 to 30 c.c. of twice normal NaOH solution in a flask ; after mixing 50 c.c. of hydrogen peroxide gradually, through a funnel, so that the addition takes 2 or 3 minutes, the mixture is left to stand for 10 minutes, the funnel is washed through with water free from CO_2, and the excess of NaOH titrated back with N/H_2SO_4 solution, using litmus as indicator. If the formalin and hydrogen peroxide be slightly acid, the amount of free acid they contain must be determined with N/10 NaOH and deducted from the above. Care must be exercised not to add the peroxide too rapidly, or the results will be too low. Paraformaldehyde is determined simultaneously by this method, but not trioxymethylene.

Iodometric Method. Twenty-five Gm. of formalin are weighed off in a closed weighing bottle, transferred to a graduated 500 c.c. flask and made up to that volume with water. Five c.c. of this solution is transferred to a stoppered bottle, 30 c.c. of N/NaOH solution is quickly added, the whole well shaken and 50 c.c. or more N/5 iodine solution run in so as produce a distinctly yellow solution, after shaking and allowing to stand for 30 seconds. The liquid is then acidified with 40 c.c. N/H_2SO_4, and the excess of iodine titrated in the usual manner with $H/10\ Na_2S_2O_3$. Two equivalents of iodine equal 1 molecule of formaldehyde according to the equation—

$$2I + 2NaOH = NaOI + NaI + H_2O$$
$$HCOH + NaOI + NaOH = HCOONa + NaI + H_2O.$$

This method cannot be used when the formalin contains acetone or ethyl alcohol, the presence of which is revealed by the formation of iodoform.

Formaldehyde Solution as a Reagent. C. Glucksmann. (*Pharm. Post.*, **37,** 413.) Formalin affords a ready means of identifying many substances. A small quantity of the article to be identified is dissolved in 1 c.c. of HCl, and 1 c.c. of formalin is added. Reaction often commences at once and is completed on boiling the mixture. *Phenol* under these conditions gives a white precipitate; *gallic* and *salicylic* acids give no reaction. *Pyrogallol* gives a red colour and precipitate; *a-napthol* a white precipitate, *β-naphthol* a reddish colour; *resorcin* a red violet precipitate; *tannin* a yellow precipitate. None of the alkaloids examined give any reaction. *Hydroquinone* forms a white precipitate, *pyrocatechol* a dull violet one.

Formaldehyde Solution, Commercial, Valuation of. C. E. Male. (*Pharm. Journ.* [4], **20,** 844.) The following modification of Schiff's method is recommended. Introduce 2 Gm. neutral AmCl, dissolved in 20 c.c. of water, into a flask or bottle of about 200 c.c. capacity, having a well-fitting stopper. Dilute 10 c.c. of the formaldehyde solution to 100 c.c. with water, and neutralize with NaOH solution, as the formaldehyde solution generally contains varying quantities of formic acid. Add 20 c.c. of this neutralized solution to the AmCl solution, then 25 c.c. of N/NaOH, and immediately stopper the flask and leave for one hour. Afterwards determine the excess of alkali with N/2 H_2SO_4, using rosalic acid or litmus solution as indicator, both of which give a sharp end reaction. A correction must be made for the density of the formaldehyde solution, which generally has a specific gravity somewhere about 1·08. 1 c.c. of N/NaOH =

0·045 Gm. of formaldehyde, according to the following equation:—

$$2NH_4Cl + 3CH_2O + 2KOH = N_2(CH_2)_3 + 2KCl + 5H_2O.$$

Galbanic Acid. K. G. von Kuelenstierna. (*Archiv der Pharm.*, **242,** 533.) Galbanic acid, obtained by Hirschsohn from galbanum (*Year-Book,* **1894,** 172), purified by crystallization or sublimation, crystallizes from dilute alcohol in fine, colourless, odourless and tasteless needles, 1 to 2 cm. long, m.p. 155–156°C. It is very soluble in organic solvents, sparingly dissolved by boiling water and insoluble in cold water. It has a feeble acid reaction on litmus, and is displaced from combination with bases by CO_2. It has no phenolic function, however, and contains no crystal-water. Its empirical formula may be either C_6H_9O; $C_{13}H_{20}O_2$; or $C_{20}H_{30}O_3$, or multiples of these; no data are yet available to indicate which of these three is correct.

Gein and Gease, Glucoside and Ferment in the Root of Geum urbanum. E. Bourquelot and H. Hérissey. (*Comptes rend.* **140,** 870.) The clove-like odour developed by the root of *Geum urbanum* is shown to be due to the action of a specific ferment, gease, on a glucoside, gein. The glucoside is only present in small quantities; it is extracted by treating the fresh root with alcohol 95 per cent., and precipitating the alcoholic extract with ether; on again redissolving this precipitate, and throwing it down with ether, repeating the process several times, and finally floating ether on the alcoholic solution, gein crystallizes out in spherocrystals. The ferment gease remains in the residue of the treatment with alcohol. The fresh root crushed with sand is extracted with alcohol 90 per cent.; the residue dried at 30° forms the fermentative powder. When a little of this powder is added to a solution of the alcoholic extract of the root, or to a solution of gein, a strong clove-like odour is produced, together with a reducing sugar, probably dextrose. Other ferments, emulsin, *Aspergillus* ferments, the fresh leaves of *Cinnamomum cassia*, of *Caryophyllus aromaticus*, and of *Illicium anisatum* are without the least action on solutions containing gein, even after prolonged contact, but on adding a little of the fermentative powder of the root to them, they at once develop the odour of cloves. *Geum rivale*, however, contains a ferment which behaves exactly like gease of *G. urbanum*, and its root also gives off a clove-like odour when bruised, so that it probably contains gein as well. Gease is completely insoluble in water, and aqueous macerations of the root have no fermentative action, nor can it be extracted with glycerin. The only method of obtaining fermentation is to use the fermentative powder of the root as described above. The yield of essential oil from the hydrolization of gein is very small, equivalent to about 1 per mille of the fresh root. The chief constituent is eugenol. Dried commercial roots were found to yield no essential oil.

Ginger, Essential Oil of. (*Haensel's Report, April,* **1905,** 19.) *Cochin Ginger Oil.* The yield from this ginger was only 1·5 per cent., consequently this variety did not prove to be a remunerative source of the oil. The product had the following characters. Sp. gr. at 15°C., 0·8826; $[\alpha]_D - 8{\cdot}6°$; saponification value, 17; solubility in alcohol, 80 per cent. 1 : 65.

African Ginger Oil. Sp. gr. 0·8795; $[\alpha]_D - 8{\cdot}28°$; saponification value, 13·5; solubility in alcohol, 80 per cent. 1 : 65, not quite clear.

Gingergrass Oil, Constituents of. (*Schimmel's Report, May,* **1905.**) The new alcohol isolated last year from gingergrass oil (*Year-Book,* **1904,** 93) is now identified as dihydrocuminol, $C_{10}H_{16}O$. It boils at 226–227°C. under 767 mm.; has the sp. gr. 0·9510 at 15°; $[\alpha]_D - 13° 18'$ $[\eta]$ 1·49629. Various products of this alcohol are described. In addition to this, iso-carvone was isolated from a fraction boiling at 80–83·5° under 5 mm. pressure. This boils at 230–231°C. under 760 mm. $[\alpha]$ $-10° 43'$; sp. gr. 0·9645. Although it was optically active, the bulk of the ketone consisted of inactive carvone, as shown by the m.p. of the semicarbazone and the oxime. The list of constituents now recorded as occurring in gingergrass oil now comprises: dextrophellandrene dextrolimonene, dipentene, an aldehyde $C_{10}H_{16}O$; dihydrocuminol; geraniol and iso-carvone. It is evident that gingergrass oil is not, as hitherto supposed, an inferior palmarosa oil. It is probably produced by a grass quite distinct from *Andropogon schœnanthus.*

Globulin from the Seed of Castanea vesca. W. E. Barlow. (*Journ. Amer. Chem. Soc.,* **27,** 274.) The Spanish chestnut is found to contain a globulin, castanin, which in most reactions closely resembles corylin, the globulin of the hazel-nut, but which has a different coagulating point and is precipitated by means of ammonium sulphate.

Guaiacum, Influence of Certain Salts and Organic Substances on the Oxidation of. E. G. Wilcox. (*Proc. Chem. Soc.*, **20,** 197.) The influence of various salts on the oxidation of guaiacum with H_2O_2 has been investigated by determining the time necessary to produce a standard blue tint, under similar conditions of concentration of the guaiacum, of the peroxide, and of the salt, at the same temperature. AmCl, LiCl, KCl, $BaCl_2$, the chlorides of iron and aluminium ; NaBi, KBr, KI, NaF and KNO_3 accelerate the oxidation. $AmNO_3$, KNO_3, $Ba2NO_3$; Na_2SO_4, K_2SO_4 and $MgSO_4$ exert no appreciable influence. Of all the salts examined the halogens alone showed a true acceleration ; for although KNO_2 increases the rate of oxidation of guaiacum in the presence of H_2O_2, that salt alone oxidizes the resin ; the same is the case with Fe_2Cl_6. Among the halogens the iodides have the greatest action, the effect of the others diminishing in the following order : bromides, chlorides, fluorides. Salts which form acid solutions have relatively feeble action. Ordinary "pure" aluminium chloride readily oxidizes guaiacum, without H_2O_2, but a specially purified sample had no independent oxidizing action. The activity of the commercial salt is probably due to a trace of Fe_2Cl_6. The acids of the acetic series have no action, but the metallic salts of the lower members of the series are slightly active. Carbohydrates and proteids have no action. Formaldehyde is commonly described as oxidizing guaiacum, but the action is probably due to impurities, the commercial product being very active, but pure formaldehyde is without action. The same is the case with glycerin ; when freshly distilled under diminished pressure it has no action, although, like methyl and ethyl alcohols, it accelerates the action of the haloids at normal temperatures, but at 50–70°C. all these substances have a contrary effect, retarding oxidation. Commercial glycerin is an active oxidizer of guaiacum. The carbohydrates, dextrose, levulose, sucrose, maltose, dextrin, starch and glycogen retard the action, so does mastic and proteid globulin, probably because they are themselves oxidizable. The alcohols increase the action, probably by increasing the solubility of the guaiacum resin.

Gum Tragacanth, Powdered, Detection of Powdered Acacia in. E. Payet. (*Annales de Chim. Analyt.*, **10,** 63.) A 1 in 30 solution of the gum is treated with an equal volume of a 1 : 1,000 aqueous solution of guaiacol ; a drop of H_2O_2 is then added, and the mixture agitated. In the presence of gum acacia the liquid rapidly turns brown, but if the tragacanth be pure it remains colourless.

Guttaperchas from German New Guinea and from Sumatra. A. Tschirch and O. Mueller. (*Archiv de Pharm.*, **243,** 114 and 133.) The two guttaperchas from New Guinea and Sumatra have been compared. The study of the bodies isolated has suggested the systematic classification of the constituents under the names of gutta, alban, fluavil, and albanan, bodies which have been previously isolated and named, but which appear to be generic rather than specific substances. The albans are soluble in boiling alcohol, the fluavils in cold alcohol, and the albanans are insoluble. New Guinea guttapercha yielded 28 per cent. of mixed albans and 8 per cent. of fluavils. Albanans were isolated by dissolving the alcohol insoluble residue in $CHCl_3$ and precipitating the gutta with alcohol: on standing, the albanans were slowly deposited in crystalline forms. The mixed fluavils were separable by alcohol 80 per cent. into α-guinafluavil and β-guinafluavil; α-guinafluavil, $C_{22}H_{36}O$, is insoluble in alcohol of this strength. It is an amorphous yellow powder m.p. 83°C. β-guinafluavil is lighter in colour than the α body, and is soluble in 80 per cent. alcohol. Its formula is $C_{15}H_{24}O$; m.p. 78. By the action of alcoholic KOH crude guinafluavil is split up into cinnamic acid and a crystalline resinol, guinafluavil-resinol, in peculiar crystals resembling starch granules (or oyster shells, Ed. *Year-Book*) with eccentric layers. When the separated α- and β- guinafluavils are thus treated, they give respectively α-guinafluavilresinol, m.p. 136°C. and β-guinafluavilresinol m.p. 143°, both crystallizing in needles from acetone.

Crude crystalline guinalban was separable into three distinct albans by fractional solution and crystallization with alcohol 96 per cent. The first fraction separated in spheroidal crystals and is therefore classed as γ-guinalban or sphæritalban, $C_{22}H_{32}O$, m.p. 111°C. The second fraction formed prisms of β-guinalban or crystalalban $C_{22}H_{32}O$, m.p. 136°; the third fraction occurred in fine needles of α-guinalban or needle-alban, $C_{42}H_{70}O$, m.p. 171°. β-guinalban and γ-guinalban, when saponified with alcoholic potash, give cinnamic acid and β-guinalbaresinol, m.p. 107 and γ-guinalbaresinol m.p. 168°C. respectively. Guinalbanan, $C_{48}H_{88}O$, m.p. 62°, when freshly prepared, but falling to 52°C. after keeping 3 months, was also crystallized. but only occurred to the extent of 0·7 per cent. Guinagutta, when freshly precipitated, is seen under the microscope in peculiar curved needles, but these quickly aggregate to form a solid mass.

Sumatra guttapercha, examined in a similar manner, gave albans and fluavils of a similar nature, as shown by the following table:—

GUINEA GUTTAPERCHA.			SUMATRA GUTTAPERCHA.		
Constituent.	Melting Point.	Formula.	Constituent.	Melting Point.	Formula.
Guinagutta	—	$C_{10}H_{16}$	Sumagutta	—	—
Guinalbanan	62°	$C_{48}H_{88}O$	Sumalbanan	,61°	$C_{30}H_{44}O$
α-Guinalban (Needlealban)	171°	$C_{42}H_{70}O$			
β-Guinalban (Crystal-alban)	136°	$C_{22}H_{32}O$	α-Sumalban (Crystal-alban)	228°	$C_{60}H_{80}O_3$ $C_{40}H_{52}O_2$
γ-Guinalban (Sphæritalban)	111°	$C_{22}H_{32}O$	β-Sumalban (Sphæritalban)	152°	$C_{30}H_{44}O_2$
			γ-Sumalban. (Isosphæritalban)	142°	$C_{30}H_{44}O_2$
α-Guinafluavil	83°	$(C_{22}H_{36}O)_3$			
β-Guin a fluavil	72°	$C_{15}H_{24}O$			
β-Guinalbaresinol	104	—	α-Sumalbaresinol	207°	$C_{50}H_{80}O_2$
γ-Guinalbaresinol	168°	$C_{26}H_{44}O$	β-Sumalbaresinol	151°	$C_{50}H_{80}O_2$
			,-Sumalbaresinol	171°	$C_{40}H_{64}O_2$
α-Guinafluavilo-resinol	136°	$C_{28}H_{48}O_2$	Sumafluavilo-resinol	—	—

Gymnostachyum febrifugum. D. Hooper. (*Pharm. Journ.* [4], **19**, 4.) The roots of this Acanthaceous plant have a reputation among the natives as a febrifuge; also when ground in lime juice as a remedy for biliousness, sore mouth and foul tongue.

The small rhizomes, from 1¼ to 2 in. in length, 3/16 in. in diameter, are curved or slightly contorted, brown in colour, and bitter in taste. Numerous long rootlets give a bearded appearance to the fresh drug, but are easily broken off in handling. The scars of fallen leaves remain as tooth-like swellings on the rhizome, which sometimes give it a moniliform appearance. The roots are woody, and a section presents a brown or reddish-brown epidermal layer, a thick blackish-coloured cortex, and a light-coloured wood with a hollow centre. The black cortical portion contains the active principle of the root.

The bitter principle was found to be of a resinoid nature, partly soluble in ether and water, entirely soluble in alcohol. It was of an acid nature, and dissolved in alkalis with a yellow colour. Small portions evaporated to dryness dissolved in concentrated sulphuric acid with a brown coloration, gradually developing to a rich plum-coloured solution. An aqueous solution of the alcoholic extract of the root gave slight precipitates with mercury-potassium iodide, and iodine in potassium iodide, but no alkaloidal substance was removed from the extract when shaken out with ammonia and immiscible solvents. In addition to the bitter principle which was apparently the chief active constituent, tannin and a substance readily reducing Fehling's solution were detected. During the concentration of the alcoholic extract small masses of acicular crystals of a cholesterol m.p. 162°C. separated out.

Gynocardia odorata, Fixed Oil from the Seeds of. F. B. Power and M. Barrowcliff. (*Proc. Chem. Soc.*, **21,** 176.) Prior to 1900 the seeds of *Gynocardia odorata* were regarded as the botanical source of chaulmoogra oil. Prain and Holmes have shown however, that this is erroneous, and that *Taraktogenos kurzii* is the true botanical source of the oil. Power and Gornall (*Year-Book*, **1904,** 48, 49) have also shown that commercial chaulmoogra oil is identical with the oil obtained by them from authentic specimens of *Taraktogenos* seeds.

It is now shown that the so-called "chaulmoogra oil" or "gynocardia oil" could not have been obtained from *Gynocardia* seeds, since the oil from these seeds is liquid at ordinary temperatures and is optically inactive.

The authentic seeds of *Gynocardia odorata* used were collected in Assam. They yielded 19·5 per cent. of oil on expression, and 27·2 per cent. on extraction with ether. The oil was fluid, yellow in colour, and resembled linseed oil in odour; sp. gr. 0·925 at 25°C.; acid value, 4·9; saponification value, 197; iodine value, 152·8. It consisted chiefly of the glyceryl esters of linolic acid or its isomers, with a considerable amount of palmitic acid; linolenic and isolinolenic acids, the latter preponderating; and a relatively small amount of oleic acid. The seeds also contain 5 per cent. of the glucoside gynocardin. (See *Year-Book*, **1904,** 99.)

Gynocardia odorata Seeds, Amount of Prussic Acid in. M. Greshoff. (*Apoth. Zeit.*, **20,** 365.) The author confirms the existence of crystalline gynocardin (*Year-Book*, **1904,** 99) in chaulmoogra seeds. The amount of HCN found by distillation from the press cake after extraction of the oil was 0·92 per cent. Whole seeds, cut under water, crushed and allowed to macerate in a closed vessel for 24 hours before distilling, gave 0·98 per cent. of HCN. Neither benzaldehyde nor acetone were detected in the distillate.

Gynocardin, Further Notes on. F. B. Power and F. H. Lees. (*Proc. Chem. Soc.*, **21,** 88. See also *Year-Book,* **1904,** 99.) The seeds of *Gynocardia odorata*, on contact with water, yield 0·44 per cent. of HCN calculated on the entire seed, or 0·63 per cent. on the kernels only. The yield of crystalline gynocardin is about 5 per cent. The crystals separating from aqueous solution have the formula $(C_{13}H_{19}O_9N)_2 + 3H_2O$. The crystal water is given up at 115°C., when the anhydrous glucoside melts at 162–163°C., and has the $[\alpha]_D$ 21° $+72{\cdot}5$ in aqueous solution. When acetylized-*hepta-acetylgynocardin*, $C_{13}H_{12}O_9(C_2H_3O)_7N$, is formed in needles; m.p. 118–119°C. The seeds contain a specific ferment *gynocardase*, which readily hydrolizes the glucoside at the ordinary temperature; but it is not easily hydrolyzed by boiling with 5 per cent. H_2SO_4 or HCl, according to the equation—

$$C_{13}H_{19}O_9N + H_2O = C_6H_{12}O_6 + C_6H_8O_4 + HCN.$$

Of these products only dextrose and HCN could be isolated, the body $C_6H_8O_4$ readily undergoing secondary decomposition with the formation of amorphous matter. Gynocardin is distinguished from other cyanogenetic glucosides by its relatively greater resistance to hydrolyzing agents. It is readily hydrolyzed by $Ba(OH)_2$, forming *barium gynocardinate* $(C_{12}H_{19}O_9{\cdot}CO_2)_2Ba$ and ammonia, according to the equation—

$$C_{13}H_{19}O_9N + 2H_2O = C_{12}H_{19}O_9{\cdot}COOH + NH_3.$$

Gynocardinic acid, $C_{12}H_{19}O_9{\cdot}COOH$, forms a syrup which does not reduce Fehling's solution and is dextrorotatory. It is hydrolyzed by acids, thus—

$$C_{12}H_{19}O_9{\cdot}COOH + H_2O = C_6H_{12}O_6 + C_7H_{10}O_6.$$

Dextrose and an acid are thus formed. The latter was isolated as the quinine salt $C_{20}H_{24}N_2O_{21},C_7H_{10}O_6$, which crystallized in needles, m.p. 225°C. with decomposition. It was only to be isolated in small quantity. Gynocardin is either the dextrose ester of the cyanhydrin of a trihydroxyaldehyde

$C_5H_4(OH)_3{\cdot}CHO$, or of a ketone $C_5H_5(OH)_3 : CO$, and its formula may be expressed as either $C_5H_4(OH)_3{\cdot}CH(CN){\cdot}O{\cdot}C_6H_{11}O_5$ or $C_5H_5(OH)_3 : C(CN){\cdot}O{\cdot}C_6H_{11}O_5$. Gynocardin is devoid of appreciable physiological action.

Hardwickia binata, Oleoresin of. (*Schimmel's Report, May*, **1905,** 85.) The oleoresin of the Leguminous tree which is a native of British India, known in the vernacular as "oil of ennaikulavo," is red brown in colour with a greenish fluorescence. The odour is peculiar; sp. gr. 1·002; acid value, 96·15; ester value, 12·31; insoluble in 1 : 10 in alcohol 80 per cent. It yields 44 per cent. of colourless essential oil on steam distillation, the residual resin being green and brittle. The essential oil had the sp. gr. 0·9062; $[\alpha]_D = 7° 42'$; acid value, 0·85; ester value, 2·88; solubility in alcohol. 95 per cent. 1 : 5 and more.

Hops, Essential Oil of, Adulterated with Gurjun Balsam. (*Schimmel's Report, May*, **1905,** 49.) A sophistication of hop oil with gurjun balsam is recorded. The adulterated oil had the sp. gr. 0·9189 at 15°. and the $[\alpha]_D - 40° 40'$; the sp. gr. of pure oil is 0·855 to 880° at 15°C.; $[\alpha]_D$ almost O. The adulterated oil yielded fractions with rotation as high as $-86° 50'$. It also had a distinct but faint greenish fluorescence.

Hydnocarpus wightiana and H. anthelmintica, Constituents of. F. B. Power and M. Barrowcliff. (*Proc. Chem. Soc.*, **21,** 175.) The seeds of *H. wightiana* gave on expression 32·4 per cent. of fatty oil, and 41·2 per cent. by extraction with ether. The expressed oil had the following characters:—M.p. 22–23°C.; sp. gr. 0·958 at 25°C.; $[\alpha]_D + 57{\cdot}7°$ in $CHCl_3$; acid value, 3·8; saponification value, 207; iodine value, 101·3.

The seeds of *H. anthelmintica* yielded 16·3 per cent. of fixed oil on expression and 17·6 with ether. The expressed oil had the m.p. 24–25°C., sp. gr. 0·953 at 25°C.; $[\alpha]_D + 52{\cdot}5$ in $CHCl_3$.; acid value, 7·5; saponification value, 212; iodine value, 86·4.

These oils very closely resembled chaulmoogra oil from *Taraktogenos kurzii* both in characters and composition, consisting chiefly of the glyceryl esters of chaulmoogric acid $C_{18}H_{32}O_2$, and a lower homologue of the same series which was isolated, both from these oils, and from chaulmoogra oil. This new acid, hydnocarpic acid $C_{16}H_{28}O_2$, crystallizes from alcohol in glistening leaflets, m.p. 60°; $[\alpha]_D + 68$ in $CHCl_3$. *Methyl hydnocarpate*,

$C_{15}H_{27}\cdot COOMe$, was obtained as a colourless oil; b.p. 200–203°C. under 19 mm.; m.p. 8°C.; $[\alpha]$ +62·4° in $CHCl_3$. Ethyl hydnocarpate $C_{15}H_{27}\cdot COOEt$, has the b.p. 211° under 19 mm.; $[\alpha_D]+51{\cdot}6°$ in $CHCl_3$. *Hydnocarpamide* $C_{15}H_{27}\cdot CO\cdot NH_2$ forms needles from alcohol; m.p. 112–113° $[\alpha]_D^{30°}+70{\cdot}2°$ in $CHCl_3$.

The oil of *H. wightiana* contains also a small proportion of an acid or acids belonging to the linolic or linoleic series; that of *H. anthelmintica* a small amount of oleic and palmitic acids. These oils have long been used in Western India and in China for the same medicinal purposes for which chaulmoogra oil is employed. (See also *Year-Books*, **1891**, 187; **1900**, 138, 139.)

Hydrazine Sulphate as a Reagent for Hæmoglobin. E. Riegler. (*Zeits. für Analyt. Chem.*, **1904**, 96.) Hydrazine sulphate, 5 Gm., is dissolved in NaOH solution, 10 per cent., 100 c.c., and alcohol, 96 per cent., 100 c.c. are added. The mixture is set aside for a few hours, then filtered. In the case of solids, a small particle is thoroughly shaken up in a stoppered tube with 5 or 10 c.c. of the reagent. In the presence of hæmaglobin the liquid acquires a colour varying from pink to red, and its spectrum shows two characteristic absorption bands between D, E and b. When only a trace of hæmaglobin is present, the mixture is barely coloured, and there is only one band at D. The reagent is useful to demonstrate the presence of hæmaglobin and its decomposition products in urine and other fluids, also on linen.

Hydrochloric Acid in the Gastric Secretion. A. Frouin. (*Bull. Soc. Chim.* [3], **33**, 256.) In the pure gastric secretion, uncontaminated by alimentary contents of the stomach, the HCl is entirely free, so that on evaporating the juice *in vacuo*, at normal temperatures, the whole of the acid is removed. The author therefore refutes the statement of other investigators that HCl forms an integral part of the pepsin molecule, and claims that the pepsin with which these results were obtained, precipitated by the action of low temperatures on the gastric juice, was largely contaminated with esophagal secretions. Pure gastric juice does not afford a precipitate when exposed to low temperatures. On the other hand, it is well known that the acid forms organic compounds with the products of digestion and the alimentary substances in the stomach.

Hydrogen Peroxide, Colorimetric Determination of. P. Planès. (*Journ. Pharm. Chim.* [6], **20**, 538). The sample of H_2O_2 solution is first diluted with 9 volumes of water; 5 c.c. of this dilution is introduced into one of two graduated 20 c.c. twin tubes and treated with 3 c.c. of 10 per cent. KI solution and 1 c.c. of 8 per cent. H_2SO_4. In the other tube the colour is matched with N/10 iodine solution, 1·8 c.c. of which is equivalent to 1 c.c. of oxygen.

Hyoscyamus muticus and Datura stramonium, Indian. (*Bull. Imp. Inst.*, **2**, 222–224.) Two specimens of *Hyoscyamus muticus* from the Punjab and Larkana contained respectively 0·38 and 0·28 per cent. of hyoscyamine. The *Datura stramonium* seeds from Bushahr gave only 0·26 of hyoscyamine. Both these drugs are of lower alkaloidal value than the Egyptian variety of *H. muticus* and the European form of *D. stramonium.* (See *Year-Books*, **1899,** 143; **1901,** 70; **1903,** 560).

Incineration, Coarsely Powdered Pumice-Stone as an Aid to. — Duyk. (*Annales de Chim. Analyt.*, **9**, 252.) The solid or extractive matter to be ashed is mixed with an equal weight of recently calcined coarsely powdered pumice stone, then burnt off in the usual manner in the muffle or over the gas, with a moderate flame. By this method of manipulation the most refractory substances such as albumin, wool, and yeast are readily reduced to a perfect ash. The residue thus obtained is in an excellent condition for subsequent treatment with solvents.

Inula graveolens, Essential Oil of. (*Schimmel's Report, May*, **1905,** 82.) This widely-distributed Mediterranean composite yields a brownish yellow oil with a green fluorescence. From its odour, it probably contains bornyl acetate. Sp. gr. at 15°C. 0·9754; $[a]_D - 36° 40'$; acid number, 8·45; ester number, 161·3; acetyl number, 239·38; solubility in alcohol, 70 per cent., 1 : 3 to 1 : 3·5, with separation of a paraffin.

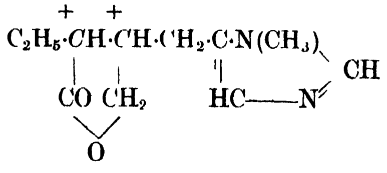
Iodoform, Determination of. — Utz. (*Pharm. Centralh.*, **45,** 985.) *Assay of Iodoform.* The present qualitative tests given in the Ph. G. (and the B.P.) are stated to be insufficient; the following quantitative method of assay of Lehmann is recommended. Ten Cgm. of the iodoform is weighed off, and dissolved in 10 c.c. of ether alcohol; one drop of HNO_3, followed by 10 c.c. of N/10 $AgNO_3$ are then added and the mixture slowly warmed up on the water-bath; when neither the odour of CHI_3 nor of

HNO_3 are perceived, the liquid is allowed to cool. When cold the uncombined $AgNO_3$ is titrated with N/10 AmCNS, using iron alum as the indicator. Each c.c. of N/10 $AgNO_3$ thus found to be used up, × 0·0131 gives the amount of iodoform present. The above quantity of absolutely pure iodoform will require 7·3 c.c. of N/10 $AgNO_3$; but the presence of 1 per cent. of moisture and slight traces of alkali chlorides may be tolerated, so that a sample assaying 98 to 99 per cent. may be considered as satisfactory.

Assay of Iodoform Dressing. The method of Lehmann, which consists of extracting 5 Gm. of the material with ether-alcohol, by agitation, making up to 100 c.c. and taking 20 c.c. of the solution for assay as above, is found to be most satisfactory. The process of extraction in a Soxhlet, as proposed for the new Codex, is stated to be valueless.

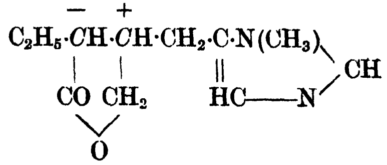
Isopilocarpine, Conversion of, into Pilocarpine. H. A. D. Jowett. (*Proc. Chem. Soc.*, **21**, 172.) Isopilocarpine and pilocarpine are considered to be stereoisomeric and not to differ structurally. By heating pure isopilocarpine with alcoholic potash, a small quantity of pilocarpine, giving the hydrochloride, with the m.p. 201 and $[\alpha]_D$ +92·8° and the nitrate, m.p. 177–178° C. was obtained.

The formula of pilocarpine may therefore be written—



$$\begin{array}{l} \qquad\;\; + \quad + \\ C_2H_5\cdot \mathit{CH}\cdot \mathit{CH}\cdot CH_2\cdot C\cdot N(CH_3)\diagdown \\ \qquad | \quad\;\; | \qquad\qquad \| \qquad\qquad\quad CH \\ \quad\; CO\;\, CH_2 \qquad\; HC\text{——}N\diagup \\ \qquad\;\; \diagdown\diagup \\ \qquad\quad O \end{array}$$

and that of isopilocarpine—



$$\begin{array}{l} \qquad\;\; - \quad + \\ C_2H_5\cdot \mathit{CH}\cdot \mathit{CH}\cdot CH_2\cdot C\cdot N(CH_3)\diagdown \\ \qquad | \quad\;\; | \qquad\qquad \| \qquad\qquad\quad CH \\ \quad\; CO\;\, CH_2 \qquad\; HC\text{——}N\diagup \\ \qquad\;\; \diagdown\diagup \\ \qquad\quad O \end{array}$$

Japan Wax. E. J. Parry. (*Chem. and Drugg.*, **66**, 34.) Specimens of Japan wax examined some years back were found to have iodine-absorption values about 6 to 7 per cent., usually not higher than 4 per cent. These results were in accordance with those published by Huebl (4·2), Lewkowitsch (4·9 to 6·6), Zeitel and Van der Want (8·3 to 8·5), and Allen (4·9 to 6). Quite recently, however, Bernheimer and Schiff have published figures from 10·6 to 11·3, and Ahrens and Hett give from 13·1 to 15·1 per cent. Such a rise in this very constant figure would at once suggest a change in the composition of the commercial article.

Specimens recently examined by the author gave the following figures :—

	1	2	3	4	5
Melting-point .	50°–51°	50°–52°	52°–54°	49°–53°	49°–54°
Saponification value . .	21·8%	22·0%	22·2%	21·9%	22·1%
Iodine-value .	11·9%	13·8%	13·7%	12·5%	13%
Hehner-value .	89%	90%	90·5%	89·5%	90%
Sp. gr. at 15°C.	0·979	0 980	0·981	0·977	0·978
M.P. of fatty acids	54°	55°	55°	54°	56°

With regard to the melting-point, it is to be noted that Japan wax has a double melting-point, and if rapidly cooled after melting this will be found to be about 40° to 42°. In the samples now examined the melting-point was not sharp, but gradual over several degrees.

The samples were not so soluble in absolute alcohol (boiling) as the old samples were previously found to be. This systematic increase in the iodine-value of Japan wax is to be explained by the following extract from Lewkowitsch's *Fats and Oils*. Under Japan wax, which, strictly, should be the product of the berries of several sumach-trees, chiefly *Rhus succedanea, R. acuminata, R. vernicifera,* and R. *sylvestris,* he says (p. 755) :—

" With the growing demand for Japan wax, the aim has been to increase the output ; this is reached by mixing the press residue or even the ground berries with a certain proportion (usually 10 per cent.) of perilla oil. This practice has been on the increase during the last ten years ; therefore the discrepancies in the iodine-values recorded in the table of constants are readily explained."

It is therefore most probable—is, in fact, practically certain—that the Japan wax of to-day contains a little perilla oil.

Juglans regia, Saccharose in. — Salvoni. (*Repertoire*, [3], **17,** 127.) The kernels of walnuts are found, like hazel, to contain saccharose.

Juniper Berries, Russian, Essential Oil of. (*Schimmel's Report, Oct.*, **1904,** 50.) Specimens of Russian oil of juniper examined, otherwise normal, had a dextro-rotation, $[\alpha]_D$ + 7° to + 8°.

Lactase in the Vegetable Kingdom. A. Brachin. (*Journ. Pharm. Chim.* [6], **20,** 300.) Continuing the work of Bourquelot and Hérissey (*Year-Book,* **1904,** 105), the author finds that lactase is widely distributed in plants ; its presence was demonstrated in the following Rosaceous seeds ; *Prunus spinosus ;* cultivated plum ; *Cerasus lusitanica ;* cultivated *cherry ; Cydonia vulgaris ; Sorbus latifolia ; Cratægus oxycantha ; Eryobothrya japonica ; Amelanchier vulgaris.* In *Cruciferæ* the seeds of *Sinapis alba* and of *S. nigra* contained the ferment, and the fresh crushed leaves of *Cochlearia armoracia* when introduced direct into the test solution, but macerations of the same were inactive. Lactase is shown to be without action on potassium myronate contained in these seeds. A number of representative plants were then examined, and lactase detected in all ; the only instances in which it was not found were in the seeds of *Euonymus europæus, Capparis spinosa,* and *Berberis vulgaris.* Among the lower organisms, *Aspergillus niger* contains no lactase ; *Bacillus coli communis* and yeasts consume lactase, but no hydrolized lactase is found in the culture media. It would appear that these lower organisms secrete lactase according to their needs.

The fact that lactase is a specific ferment, distinct from emulsin, is shown by the fact that its action is arrested between 75–80°C., or 10° lower than emulsin. Also the presence of 0·24 per cent. of acetic acid inhibits its action ; emulsin is only affected by five times as much, 1·20 per cent.

Lactose, New Reaction for. A. Woehlk. (*Zeits für Analyt. Chem.*, through *Pharm. Centralh.*, **46,** 274.) Half a Gm. of milk sugar is cautiously heated on the water-bath with 10 c.c. of 10 per cent. AmOH solution, avoiding boiling. In 15 to 20 minutes a madder-red colour is produced. Other sugars, when thus treated with ammonia, give, at the most, a straw-yellow colour. The reaction, owing to the nature of the colours produced, is not available for the detection of the presence of cane sugar in milk sugar. The spectroscopic behaviour of the milk sugar colour in solution is sharply differentiated from that of other sugar.

Lactuca muralis, Occurrence of, and Distribution of, Mydriatic Alkaloid in. R. Wright (*Pharm Journ.* (4) **20,** 548.) The discovery by Dymond of a mydriatic alkaloid in *Lactuca virosa*, which was subsequently confirmed by the author and Farr, led to the examination of *Lactuca muralis* to ascertain whether or not it contained a similar principle.

To avoid loss of the minute amount of alkaloid probably present, the following method was adopted: The dried material was reduced to powder and exhausted by percolation with 70 per cent. alcohol, containing 5 per cent. acetic acid, B.P. The percolate was evaporated over a waterbath until all the alcohol had been dissipated, the aqueous liquid filtered, the filter washed with hot water and the filtrate and washings transferred to a stoppered glass separator. A slight excess of ammonia was added, and the alkaline liquid shaken up with four successive 5 c.c. chloroform. The latter were drawn off in turn and bulked and then shaken up with three successive 5 c.c. distilled water containing 1 per cent. dilute sulphuric acid. The mixed acid solutions were treated with a slight excess of ammonia, and the alkaloid shaken out with chloroform. This process of purification was carried out three times in all, the alkaloid being finally obtained in a perfectly colourless solution in chloroform. This was transferred to a tared glass dish and the chloroform allowed to evaporate at a low temperature.

By this process, which absolutely precludes loss of alkaloid in any stage, minute quantities of such were obtained from each part of the plant. All the residues when dissolved in a little very slightly acidulated water gave characteristic precipitates with Thresh's and Mayer's reagents, and each solution when instilled into the eye produced distinct mydriasis. The following figures represent the yield of alkaloid by the different parts of the dried herb: Root, 9 Gm. = 0·0014 Gm. = 0·15 per mille; Stem, 90 Gm. = 0·0019 Gm. = 0·02 per mille; Leaves, 40 Gm. = 0·0023 Gm. = 0·06 per mille; Flowering tops, 13 Gm. = 0·0006 Gm. = 0·046 per mille.

Lard from Cottonseed Meal-fed Hogs, Reaction of, with Halphen's Test. E. Fulmer. (*Journ. Amer. Chem. Soc.*, **26,** 837.) An investigation was undertaken with the view of determining to what extent the lard from cottonseed meal-fed hogs would give a coloration with Halphen's reagent.

Lard was rendered from samples of fat taken from hogs fed on cottonseed meal from kidney, jowl, back and intestines, and in many cases also from the belly.

All lard samples gave a distinct and, in some cases, a very strong coloration when treated with Halphen's reagent. The coloration-equivalent, expressed in percentages of cottonseed oil, ranged from 0·4 to 15 per cent.

In general, the greatest degree of coloration was found in kidney-fat lard, and the least in intestinal-fat lard. In a majority of samples back-fat lard gave a greater intensity of colour than that from jowl-fat. The colour-producing principle of cottonseed oil is transmitted to all parts of the animal, although in unequal amounts.

When the colour-producing substance is once deposited in the fat of hogs, it is exceedingly persistent, as illustrated in the case of an animal being killed three months after it had received its last ration of cottonseed meal, lard rendered from its fat showing a coloration equivalent to 4 per cent. of cottonseed oil; and another hog, killed after having eaten no cotton meal for five months, a composite sample of its fat yielding lard which showed a coloration equivalent to 3 per cent. of oil.

Laurus camphora Leaves, French, Essential Oil of. (*Schimmel's Report, May,* **1905,** 83.) The leaves of the Camphor tree grown at Cannes have yielded 0·52 per cent. of essential oil, which entirely differs in characters from any oil from a similar source previously recorded. In characters it closely approaches cardamom oil; the odour is similar to this; sp. gr. 0·9058 at 15°C.; $[\alpha]_D -26° 12'$; acid value, 0·34; ester value, 8·82; acetyl value, 46·9; solubility, 1 : 1 and more in 80 per cent. alcohol; b.p. (under 4 mm.) 35–95°C. It contains pinene, probably camphene, cineol in quantity and lævoterpineol.

Lavender, Essential Oil of, Adulterated with Ethyl Succinate and Spanish Lavender Oil. (*Schimmel's Report, May,* **1905,** 51.)

The high price reached by lavender oil during the past season has rendered sophistication very prevalent. Among the substances used for this purpose, French and American turpentine oil, spike oil, Spanish lavender oil and rosemary oil are enumerated. In some instances the lowering of the ester value, occasioned by the use of Spanish lavender oil as an adulterant, was covered by the introduction of ethyl succinate.

Lavender Oil, French, Adulteration of. (*Schimmel's Report, Oct.*, **1904,** 51.) The prevailing scarcity and consequent high price of lavender oil has induced much adulteration. Spike oil is the chief adulterant, either by direct admixture or by distilling the two kinds of flowers together; to increase the solubility of this oil Spanish sage oil is added, together with a trace of amyl acetate, to impart aroma. Generally speaking, French lavender-oil with less than 33 per cent. of esters must be regarded as impure; but there are some districts in France where the normal oil falls below this figure. For instance, the oils produced on the banks of the Var, which are highly esteemed, contain only 28 to 30 per cent. of ester. These oils have a low sp. gr. and a fairly high lævorotation. Petroleum has been met with in two samples of lavender oil examined.

Lead, Detection and Determination of, in Cream of Tartar or Tartaric Acid. L. and J. Gadais. (*Annales de Chim. Analyt.*, **10,** 98.) 100 Gm. of the cream of tartar is introduced into a conical litre flask, with 80 c.c. of distilled water and 60 c.c. of pure HCl, sp. gr. 1·17, and gently heated until dissolved; 60 c.c. of distilled water is then added, with pure copper nitrate free from lead, equivalent to 0·15 Gm. of Cu. The mixture is heated to 60°C. and SH_2 passed through it for a considerable time. The flask is then well corked and set aside for 12 hours. The precipitated sulphides are then collected, washed with SH_2 solution, and the filter containing them treated, in a small conical flask, with 8 c.c. of HNO_3 free from Pb., heating to dissolve the sulphides; then diluted with water, boiled for one minute, filtered into a 150 c.c. porcelain capsule, the flask and filter, washed, and the bulked filtrate and washings concentrated to 25 c.c. on the water-bath. This solution is transferred to a platinum capsule, washing with not more than 25 c.c. in so doing. The 50 c.c. of liquid thus obtained is submitted to the electric current, connecting the platinum capsule to the positive pole. After allowing the current to run for 12 hours, the liquid is siphoned off, without interrupting the current, and the capsule washed four times with water. It is then removed from the current, washed first with alcohol, then with ether, 4 or 5 drops of solution of tetramethyldiamidophenylmethane in acetic acid are added. This solution is allowed to flow over all parts of the capsule, when, if lead be present, a fine blue colour will be developed. For the quantitative determination of the lead 500 Gm. of the cream of tartar is dissolved as before, using 5 times the amount of acid and water. This solution is then treated with cupric nitrate equivalent to 0·15 Gm. of Cu and the process continued as above, but the platinum capsule is first tared, and after the electrolysis and washing, dried at 100°C. and weighed. The increase of weight noted, × 0·17322, gives the amount of Pb. in the cream of tartar taken.

This method, with slight modifications, is available for the determination of Pb. in tartaric acid and other tartrates.

Lecithins, Commercial, Examination of. G. Fendler. (*Apoth. Zeit.*, **20,** 22.) The author finds that by extraction with boiling absolute alcohol, the whole of the lecithin present is not dissolved ; by treating the residue insoluble in alcohol with ether, a substance is obtained which contains phosphorus and nitrogen in similar proportions to di-stearyl-lecithin. In valuing commercial lecithins, therefore, the material should first be extracted with boiling alcohol, then with ether, and the two liquids mixed The solvents are then to be distilled off and the amount of nitrogen and phosphorus determined in the residue. Direct determination of these constituents in the original gives erroneous results. The amount of these calculated on pure di-stearyl-lecithin, $C_{44}H_{90}NPO_9$, are P 3·837 per cent. and N 1·738 per cent.

Ledum palustre, Stearoptene of the Essential Oil of. — Lomidse. (*Pharm. Centralh.*, **45,** 590.) The flowering plant gathered in 1901 yielded 1·5 per cent. of essential oil, and 0·5 per cent. in 1902. The oil is a thick fluid at normal temperatures, which deposits crystals on standing. The stearoptene was isolated by cooling a 1 : 2 solution of the oil in 90 per cent. alcohol to −10°C., separating the crystals, and distilling off the adhering portion of oil at 80°C. under 20 mm. pressure. The residue thus obtained, recrystallized from alcohol, gave the pure stearoptene in long, needle-shaped, colourless crystals, having the formula, $C_{15}H_{26}O$; m.p. 104°C.; b.p., 281°C. in an atmosphere of CO_2 since it is readily oxidized in the air.

Lemon, Essential Oil of, New Indirect Process for Determination of the Aldehydic Contents. E. Berti. (*Chem. and Drugg.*, **66**, 682.) To 10 c.c. of the oil add 50 c.c. of a saturated solution of potassium bisulphite in an Erlenmeyer flask, capacity about 250 c.c. Close it with a stopper in which is inserted a glass tube about 40 to 45 cm. long. Shake the mixture until emulsified, and heat to boiling at 5 mm. pressure for ten minutes, agitating frequently, and taking care not to overheat. Then allow to cool completely, after which heat again for another five minutes, agitating vigorously during the whole operation. Allow to cool to the temperature of the surrounding air. The mass should then be put quickly into a tapped funnel of the capacity of about 100 c.c., and some time afterwards the floating stratum of oil is to be separated from the underlying solution of bisulphite in which the combined aldehydes are found. The terpene is to be washed twice with a little distilled water and filtered with the addition of a little anhydrous sodium sulphate. When it is quite clear, examine it with the polariscope.

The difference between the deviations of the essence and of the terpene taken (of course under the same conditions of temperature) will give indirectly the quantity of aldehydes that the oil contains according to the following formula :—

$$C = \frac{100\ (A-a)}{A}$$

in which a represents the rotation of the original essence, A the rotation of the essence liberated from the aldehyde, and C the percentage of aldehydes.

Numerous analytical data of results obtained with genuine lemon oils, which showed an aldehyde content of 6·85 to 7·4 per cent. with these genuine oils mixed with lemon terpene, and with limonene and citral, have given the author concordant results. In conclusion, the author expresses the hope that a reason will be found for the low yields of terpeneless oil obtained on the manufacturing scale, compared with the amount of non-terpenic constituents indicated by these methods.

Lemongrass Oil, Adulterated with Citronella Oil. E. J. Parry. (*Chem. and Drugg.*, **66,** 140.) Specimens of lemongrass oil adulterated with citronella oil have been met with. One such had a specific gravity of 0·901 and the $[\alpha]_D -5^\circ$ (calculated from a solution in alcohol, as the oil was too dark for a direct observation). The refractive index at 20° was 1·4835. On absorption by sodium bisulphite the apparent citral value was 62 per cent., but this included the absorbed aldehydes from the citronella oil as well as the citral. The unabsorbed portion was examined, and compared with the unabsorbed portion of a pure oil. The chief difference to be noticed here was that the residue from the pure oil had a characteristic sweet odour, recalling the geraniol esters, while that from the adulterated oil was of a more typical geraniol odour. The physical characters gave no information, but an acetylation and saponification showed that the adulterated oil contained much more free alcohols than the pure oil.

The aldehydes were separated from 30 c.c. of the oil and recovered by decomposing the bisulphite compound and steam-distilling. The specific gravity of the aldehydes was only 0·886, and the refractive index 1·4789. The figures for citronellal and citral are as follows :—

Citral	0·897	1·4861
Citronellal	0·854	1·4481

This oil probably contained 30 per cent. of citronella oil ; other consignments, similarly adulterated, but to a less degree, have been met with.

Lemon Petitgrain Oil. (*Schimmel's Report, May*, **1905.**) A specimen of the essential oil of the leaves and twigs of *Citrus limonum* was found to have the following characters : Sp. gr. 0·8824 at 15°C. ; $[\alpha]_D + 21^\circ\ 81'$; $[\eta]_{D\ 23^\circ}$ 1·4725 ; it contained 24 per cent. of citral, no citronellal ; 10·5 per cent. of esters calculated as acetates ; total alcohols, 19·4 per cent., of which 11·6 was geraniol as well as camphene and limonene. It greatly resembles orange petitgrain in constituents.

Lignaloe Oil. (*Schimmel's Report, Oct.*, **1904, 55.**) Now that linalol is largely extracted for use in "synthetic" perfumery, the residual oil, after the extraction of this alcohol, finds its way into commerce. The partial removal of linalol affects the rotation of the oil, which normally should not be less than −5° ; such oils may show a dextro-rotation. The saponification value of the normal oil lies between 1 and 25; with oils from which the linalol has been partly removed it rises to 30–45. Fractional distillation, *in vacuo*, will also serve to differentiate those oils which are poor in linalol. It must be borne in mind, however, that dextrorotatory oil may result from inefficient bulking of the fractions during the distillation of normal oil. A lignaloe oil of unknown source has been met with which had the sp. gr. 0·8793 at 15°C. ; $[\alpha]_D + 7° 31'$; acid number, 1·02 ; ester number, 3·88 ; solubility, 1 : 1·7 of alcohol 70 per cent. Fractional distillation under reduced pressure showed the presence of 65 per cent. of dextro-linalol.

Lime Oil from Barbados. (*Schimmel's Report*, *Oct.*, **1904**, 54.) Authentic specimens of distilled and hand-pressed lime oils received from the Imperial Commissioner of Agriculture had the following characters.

Hand-pressed Lime Oil: Sp. gr. at 15°C. 0·9008; $[\alpha]_D + 36° 17'$; $[\alpha]_D$ of the first 10 per cent. of the distillate $+ 39°30'$; acid number 6·05 ; ester number, 29·55 ; residue on evaporation, 17·8 per cent. ; soluble in 4 and more vol. 90 per cent. alcohol, with slight cloudiness in consequence of separation of paraffin. The dilute alcoholic solution shows a faint blue fluorescence, which renders the presence of anthranilic ester probable. The oil has a golden yellow colour, and possesses a pleasant refreshing odour which greatly resembles that of lemon oil.

Distilled Lime Oil. The bright-yellow oil, which possesses a disagreeable odour like turpentine or pine tar oil, had the following constants : Sp. gr. at 15°C. 0·8656 ; $[\alpha]_D + 46° 36'$; $[\alpha]_D$ of the first 10 per cent. of the distillate $+ 53° 8'$; acid number, 1·8 ; ester number, 4·05 ; residue on evaporation, 3·16 per cent. ; soluble with slight cloudiness in 4·5 and more vol. 90 per cent. alcohol.

Linin. J. S. Hills and W. P. Wynne. (*Proc. Chem. Soc.*, **21**, 74, also *Pharm. Journ.* [4], **20**, 401, 436.) Linin, $C_{23}H_{24}O_9$, is apparently a glucoside ; on hydrolysis with dilute acids or with lime, it is split up into glucose and a body which appears to be identical with the linin of Schroeder. The yield of the crude glucoside is only 0·13 per cent. of the drug. It crystallizes from alcohol in needles, m.p. about 203°C., the exact m.p. depending on the mode of heating. It is insoluble in water, sparingly soluble in organic solvents. With concentrated H_2SO_4, it gives a deep purple coloration. It contains four methoxyl groups; attempts to prepare acetyl and benzoyl derivatives were unsuccessful. Oxalic acid was the only oxidation product which could be identified. Linin has no purgative action.

In many of its properties it resembles Podwyssotski's picropodophyllin (*Year-Book*, **1882,** 159, 163), which was re-examined in 1898 by Dunstan and Henry in the course of their investigation of the constituents of Indian and American podophyllum (*Year-Book*, **1898,** 135). Henry, who has compared the two substances, is of opinion that they are not identical, as picropodophyllin melts at 227°C., and a mixture of it with linin (m.p. 205°C.) at 184°C. The recognition of very similar purgative principles in *Podophyllum* and *Linum*, and the failure to isolate the active principle from each, lends a special interest to the present investigation, and it is hoped that a further study of the proximate principles of the two drugs will, in the hands of Dunstan and Henry, lead to fresh light being thrown on the nature of the purgative agent in each.

Lithium Citrate. D. B. Dott. (*Pharm. Journ.* [4], **20,** 440.) It has previously been pointed out that the British Pharmacopœia is inaccurate in describing this salt as deliquescent, and in regard to the temperature at which it loses the whole of its water. It does not appear to have been noted that the official statement as to the proportion of water lost, just under 100°C., is quite incorrect. The formula with four molecules of water is generally accepted as accurate. It has repeatedly been observed that well-defined crystals, which were apparently quite dry, lose considerably more than the B.P. 19 per cent Some large crystals were powdered, the powder spread on paper, and exposed for two days in the air of the laboratory. This powder lost in the water-bath under 100°C. 24·8 per cent. On transferring to the air-bath and exposing to a temperature of 150–160°C., the loss was increased to 27·6 per cent. These numbers agree very well with the formula $(Li_3\bar{C})_2,9H_2O$, which requires 24·7 per cent. for eight molecules of water, and 27·8 per cent. for nine molecules. Further experiments are needed to determine whether the salt contains more than four molecules of water, and, if so, to what amount the excess extends.

Lupin Alkaloids. (*Berichte*, **37**, 2351.) The so-called lupinidine of Liebscher is now found to be identical with sparteine, and to have the formula $C_{15}H_{26}N_2$; this base, and lupinine $C_{10}H_{19}ON$, are found in the seeds of *Lupinus luteus* and *L. niger*. *Lupanine*, $C_{15}H_{24}ON_2$, occurs in *Lupinus albus* and *L. angustifolius*. (See also *Year-Books*, **1891**, 112; **1892**, 51; **1897**, 60; **1898**, 63.)

Lupinus polyphyllus Seeds, New Alkaloid from. G. F. Bergh. (*Archiv der Pharm.*, **242**, 416.) The seeds of the familiar garden plant, *Lupinus polyphyllus*, have yielded a new alkaloid, oxylupanine, $C_{15}H_{24}N_2O_2 + 2H_2O$, which crystallizes from aqueous acetone in large colourless rhombic prisms. It is very soluble in water, soluble in $CHCl_3$, and sparingly soluble in ether. The air-dry base melts at 76–77°C., when anhydrous after drying *in vacuo* it melts at 172–174°C. When dried in the air at 100 it turns brown. Its $[\alpha]_{D20} = +64{\cdot}12$; the hydriodide $C_{15}H_{24}N_2O_2{\cdot}HI{\cdot}2H_2O$, m.p. 91–93°C.; sulphocyanide $C_{15}H_{22}N_2O_2.HCNS.H_2O$, m.p. 125°; auri chloride, $C_{15}H_{24}N_2O_2$ $HAuCl_4$, m.p. 205–206°C.; and the platinochloride $C_{15}H_{24}N_2O_2{\cdot}H_2PtCl_6 + H_2O$, dried to constant weight at 100°C., m.p. 235–236°C., were prepared. When acetylized it forms a monoacetyl ester, $C_{15}H_{23}(C_2H_3O_2)N_2O_2$, also takes up one methoxyl group on methylating. Dextrolupanine, $C_{15}H_{24}N_2O$, which has previously been found in the seeds of other species of lupin, was also present.

Magnesia, Formation of, from Magnesium Carbonate by Heat, and the Effect of Temperature on the Properties of the Product. W. C. Anderson. (*Proc. Chem. Soc.*, **21**, 11.) Magnesia, prepared from different substances and by different methods, varies greatly in its properties. Experiments have been conducted with magnesite (native magnesium carbonate) and the three forms of artificial carbonate, to determine the lowest temperature at which the evolution of CO_2 could be distinctly recognized, the rates at which the evolution of the gas takes place at higher temperatures, and the relative solubility in water of the MgO produced. Native magnesite yielded 0·4 per cent. of its weight of CO_2 in 20 hours at 350°C., and the rate of evolution increased rapidly with rise of temperature. With two of the artificial carbonates complete expulsion was reached at about 750°C., but with "heavy" carbonate only above 810°C. The MgO obtained from "heavy" carbonate was found to be more rapidly soluble in water than that obtained from "light" and "crystal" carbonate, so long as the heating did not greatly exceed the temperature needed for complete decomposition. As the temperature of preparation was increased, the solubility of the MgO formed decreased, but much more so in the case of "heavy" carbonate than in the other two. It is inferred that polymerization occurs in heating MgO, which takes place more rapidly with the product of "heavy" carbonate. The rate of solution is considered to be a measure of the rate of hydration which is most rapid in the molecule $(MgO)_n$, obtained by heating the heavy carbonate at 810°C.

Manganese Dioxide, Detection of Traces of Iron in. H. Cormimboeuf. (*Annales de Chim. Analyt.*, **10,** 51.) Two Gm. of the oxide is heated to redness in a platinum crucible, then dissolved in 25 to 30 c.c. of strong HCl; solution is complete after a few minutes' boiling; when the black colour has changed to yellowish, the liquid is diluted with water, and filtered. After washing the insoluble residue, the filtrate is partially neutralized with NaOH or KOH, but left distinctly acid. Neutralization is completed with ZnO free from iron, an excess of about 5 Gm. of this being added. When the supernatant liquid has become quite colourless the precipitate of ZnO and Fe_2O_3 is collected, washed, and dissolved in excess of dilute H_2SO_4. Pure zinc is then added to the acid liquid to reduce the iron to the ferrous state. After half an hour's action, the liquid is strained through a plug of cotton wool and titrated with standard $KMnO_4$ solution, each c.c. of which is equivalent to 0·001 Gm. Fe_2O_3.

Maple Sugar. —Buisson. (*Bull. Assoc. des Chim. de Suc. et Dist. Ind.*, through *Chem. Centralblatt*, **76,** 459.) Maple sugar from North America is golden yellow in colour and has slight honey-like aroma. It contains 85·4 per cent. of cane sugar; 5·09 per cent. of reducing sugars; 0·75 per cent. of soluble, and 0·01 per cent. of insoluble ash; with 8·75 per cent. of water and organic matter. The reducing sugars contain more dextrose than levulose, their specific rotation being $[a]^D - 20{\cdot}62°$.

Matico Oil. H. Thoms. (*Archiv der Pharm.*, **242,** 328.) The so-called matico ether of Fromm and van Emster (*Year-Book*, **1903,** 117) is found to consist of a mixture of parsley-apiol and dill-apiol, the latter predominating. It also contains a hydrocarbon, m.p. −18°C., and another phenol ester.

Matrine, the Active Principle of Sophora angustifolia. —Ishizaka. (*Apoth. Zeit.*, **19**, 855.) The author has investigated the physiological action of matrine, $C_{15}H_{24}N_2O$, isolated by Nagai from the roots of the plant (*Year-Book*, **1896**, 106). The alkaloid is toxic, the lethal dose for dogs and rabbits being 0·3 Gm. for each kilo of bodyweight. It slows and even arrests respiration, deadens the motor centres, occasions convulsions, and increases the arterial pressure. The root is used in China for dysentery and typhus.

Melia azadirachta Leaves, Constituents of. D. Hooper. (*Pharm. Journ.* [4], **19**, 576.) Among the plants said to be useful for keeping away mosquitos, a correspondent in the *British Medical Journal* quoted the *Nim* (*Melia azadirachta*) as being poisonous to these insects. The fresh leaves were tested by distilling them with water, when it was found that a distinct allyl– or onion-smelling compound was present in the distillate. The powdered leaf, when burnt, also gave off a disagreeable odour, and the smoke was fatal to some insects. The extract of the leaves was intensely bitter, and gave evidence of the presence of an alkaloid.

Mercury, Detection of Traces of, in Urine. —Zenghelis. (*Zeits. für Analyt. Chem.*, through *Journ. Pharm. Chim.* [6], **21**, 371.) A spiral composed of two very fine wires, one of copper, the other of platinum, about 20 cm. long, is immersed in the urine, rendered faintly acid with HCl, for 24 hours. The spiral is then withdrawn, cautiously washed first with very dilute NaOH solution, then successively with water, alcohol and pure ether; it is then carefully wiped on tissue paper and dried for an hour, over H_2SO_4. It is then pressed to the bottom of an absolutely dry test-tube 7 or 8 cm. high. Meanwhile iodine, 1 Gm., is dissolved in absolute ether 4 c.c., and by means of a fine feather a small ring of the solution is painted round the inner side of the tube, about 1·5 or 2 cm. above the wire spiral. A piece of wet filter paper is placed over this on the outside of the tube, to act as a condenser. The tube is then plugged with a loose pledget of wool, and the portion containing the spiral gently heated, while the tube is held in a horizontal position. A ring of HgI or HgI_2 will then be formed, if mercury be present where the ring of iodine has been painted. This becomes very evident when the tube is held over a black background. If a large volume of urine has to be examined, it is rendered alkaline with NaOH, a little glucose or invert sugar is added, and the whole boiled for 15 minutes. The whole of the mercury is then precipitated with the phosphates. These are collected, dissolved in HCl, and treated as described above.

To determine the amount of mercury in the urine the precipitated phosphates are to be dissolved in dilute HNO_3, the solution made up to 25 c.c. is then submitted to electrolysis, employing as the cathode a small sheet of Pt. previously tared. After electrolysis, this is detached, washed with water, then with alcohol, and finally with absolute ether, dried over H_2SO_4 and weighed.

Mercury in Urine, Detection of.—Sonnic-Moret. (*Bull. des Sciences Pharmacol.*, through *Annales de Chim. Analyt.*, **10**, 151.) To destroy the organic matter 1,700 to 1,800 c.c. of urine is placed in a capacious flask fitted with a rubber cork bearing two tubes similar to those of a wash bottle: to the one which dips beneath the surface of the liquid, which should be of fairly wide diameter, a small glass capsule, filled with coarsely-powdered $KClO_3$, is attached to the outer extremity, by means of an inch or two of rubber tubing, so that the capsule hangs loosely, and on being raised will allow a few particles of chlorate to fall into the liquid. The other tube is fitted to an upright condenser. From 20 to 22 Gm. of chlorate is filled into the capsule, and the urine is acidified with 90 or 100 c.c. of HCl., sp. gr. 1·17 (or more if the sp. gr. of the urine exceed 1·018). The flask is then immersed in the water-bath ; and as soon as the liquid is thoroughly heated, the glass capsule is raised and a few granules of chlorate allowed to fall into the liquid. This is so managed that it takes about an hour for the whole of the $KClO_3$ to be used up. The heating is continued for 7 or 8 hours ; then the glass capsule is taken off and the flask connected up with a CO_2 generator, by the same tube, a current of that gas being passed through the liquid until all the Cl has been washed out. When cold, the liquid is neutralized with soda.

Meanwhile a rectangle of fine copper gauze, 11 cm. × 4 cm., is rolled into a cylinder, washed with alcohol and ether, to remove grease, then in dilute HCl, and fixed in the beak of a capacious tapped funnel just below the tap. The neutralized urine is then introduced into the funnel and the tap slightly turned over, so that the liquid drips out slowly drop by drop. After it has all passed through the funnel and over the copper once, it is returned, and the operation is repeated. The copper cylinder is then washed in tepid distilled water, which is allowed to flow over it through the tap, as before, drained on filter paper and dried over H_2SO_4. It is then transferred to a subliming tube and heated, when any mercury present is sublimed in the usual manner. The nature of the sublimate may be conformed, if necessary, by submitting it to the vapour of a crystal of iodine, when it will speedily assume a red colour. By this method the presence of 0·0004 Gm. of Hg may be detected in 1,800 c.c. of urine. Possibly, by using gold or platinum gauze, more complete precipitation of the mercury might be effected.

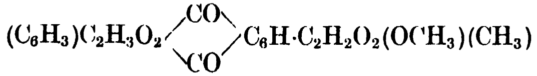
Methyl Alcohol, Detection of, in Liquids containing Ethyl Alcohol. S. P. Sadtler. (*Amer. J. Pharm.*, **77**, 106.) The following modification of the method of Mulliken and Scudder has been adopted by the U.S.P. Revision Committee for the ready and convenient detection of methyl alcohol in alcoholic preparations. Into a test-tube 1 c.c. of the preparation to be tested is introduced, and, if undiluted, made up to 10 c.c. The proportion of alcohol present should not exceed 10 per cent. by volume. A copper wire spiral is made by winding 1 metre of No. 18 copper wire closely round a glass rod 7 mm. thick, making a coil 3 cm. long, the rest of the wire being used for a handle. The coil is heated to redness in a smokeless flame, then immersed steadily quite to the bottom of the alcoholic fluid. This treatment is repeated 5 or 6 times, immersing the tube meanwhile in cold water to keep down the temperature of the liquid. The spirit is now filtered into a wide test-tube and boiled very gently. If any odour of acetaldehyde is perceptible, boiling is continued until this has been dissipated. The liquid is then cooled and 1 drop of a 1 : 200 solution of resorcinol added to it. A portion of this mixture is then floated on H_2SO_4 in another tube and allowed to stand for 3 minutes, then slowly rotated. No rose-red ring should be evident at the zone of contact of the two liquids, indicating the absence of more than 2 per cent. of methyl alcohol.

Methyl Fluoride. J. N. Collie. (*Proc. Chem. Soc.*, **20**, 180.) Methyl fluoride, when sparked from an induction coil, in a vacuum tube with aluminium electrodes, at 2 mm. pressure gives a bluish green colour. The spectrum, however, rapidly changes, and the characteristic lines of hydrogen appear. When sparked under ordinary pressure the gas is almost immediately decomposed thus, $4CH_3F = 4C + 4H_2 + 2H_2F_2$. In glass tubes a secondary change occurs, the silicon fluoride formed by the acid of the hydrogen fluoride on the glass is reduced by the hydrogen, and silicon is deposited, thus :—

$$SiF_4 + 2H_2 = 2H_2F_2 + Si.$$

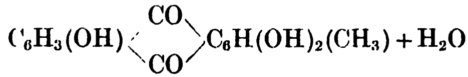
Methyl-Nataloemodin and Nataloemodin. E. Léger. (*Comptes rend.*, **140,** 1464.) Having obtained a supply of authentic material from H. G. Greenish, the author has been able to prepare nataloemodin in sufficient quantity to continue his investigation on the subject.

The methyl ester of nataloemodin, obtained by the action of sodium dioxide on nataloin, which was originally described as occurring in pale orange yellow crystals, is now found to be orange red, the tint varying with the manner of crystallization. When heated for 15 to 18 hours, at about 300°C., with a large excess of KOH, nataloemodin methyl ester is decomposed, and among the products is an acid, probably α-oxiso-phthalic acid. With fuming HNO_3, which reacts with great-violence, no nitro derivatives, but only oxalic acid is formed. With bromine the action is much slower, a pentabromide, $C_{16}H_{17}Br_5O_5$, is obtained in mahogany red needles, m.p. 293-295°. When acetylized the diacetyl-methylnataloin—



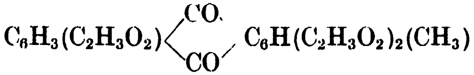
$$(C_6H_3)C_2H_3O_2{<}\begin{matrix}CO\\CO\end{matrix}{>}C_6H\cdot C_2H_2O_2(OCH_3)(CH_3)$$

—crystallizing in long, anhydrous, brilliant needles, m.p. 169°C. is obtained. Nataloemodin—



$$C_6H_3(OH){<}\begin{matrix}CO\\CO\end{matrix}{>}C_6H(OH)_2(CH_3) + H_2O$$

—is obtained by heating methyl-nataloemodin in sealed tubes with fuming HCl. It melts at 214°C., when dried at 130°C. Its solution in alkali is cherry red, changing to violet in presence of a great excess of alkali. This distinguishes it from the two other emodins, whose alkaline solutions are not so affected. When acetylized this gives triacetyl nataloemodin—



$$C_6H_3(C_2H_3O_2)\left\langle{CO \atop CO}\right\rangle C_6H(C_2H_3O_2)_2(CH_3)$$

—crystallizing in yellow needles, m.p. 203·7°C.

Monarda didyma, Essential Oil of. (*Schimmel's Report, Oct.*, **1904**, 97.) Half-dried plants cultivated at Miltitz yielded 0·04 per cent. of golden yellow oil with a pleasant aromatic, ambergris-like odour. Sp. gr. 0·8786 at 15°C., $[a]_D - 24^\circ\ 36'$, solubility in alcohol 70 per cent. 1 : 1·5 or 1 : 2. (See also *Year-Book*, **1904**, 117.)

Mydriatic Solanaceous Alkaloids, Occurrence of, in Different Plants. E. Schmidt. (*Archiv der Pharm.*, **243**, 4.) The comparative study of the different plants of the *Solanaceæ* systematically continued at Cassel has had some important results. It is found that *Datura metel* contains lævoscopolamine (hyoscine) alone, in all parts, the leaves yielding 0·55 per cent. and the seeds 0·5 per cent., unaccompanied by any notable quantity of other mydriatic bases. In this respect the plant will probably prove a more useful source of scopolamine, which, under the name of hyoscine, has found an important place in medicine, chiefly for ophthalmic use. But the scopolamine now used, chiefly derived from *Scopola*, is the inactive form, and often contains an impurity that is not easily detected, and which gives rise to irritation. The author suggests that only lævoscopolamine should be employed for medicinal purposes, since its absolute purity can easily be established by the observation of its optical activity. Since this base is readily obtained pure from *Datura metel*, and the plant is easily cultivated, it should become the commercial source of the alkaloid. *Datura arborea* contains scopolamine also in all parts, but it is accompanied by a small quantity of hyoscyamine. *Datura quercifolia* yields a mixture of approximately equal parts of scopolamine and hyoscyamine, and therefore takes a place between *D. metel* and *D. stramonium*. The last-named contains practically nothing but hyoscyamine. *Atropa belladonna*, in all parts, yielded chiefly hyoscyamine; the leaves of the wild plants gave 0·4 per cent. of total alkaloids, those of cultivated plants 0·26 per cent.; green unripe fruit gave 0·797 per cent. and ripe berries 0·831 per cent. The bases were isolated as follows. The coarsely powdered drug was extracted with alcohol, to which a few drops of acetic acid had been added, the resulting tincture freed from alcohol and the residue diluted with water containing a little hydrochloric acid. After filtration the alkaloids were liberated by sodium bicarbonate and shaken out with ether-chloroform, the last traces being removed by potassium carbonate and a large volume of the same solvent. From the ether-chloroform solution the alkaloids were extracted by dilute hydrochloric acid and converted into the aurichlorides. Hyoscyamine gold chloride crystallizes in lamellæ melting at 160–161°C. and containing 31·24 per cent. of gold. The last mother liquors yielded, as a rule, a little atropine aurichloride (m.p. 134°C.), and also amorphous aurichlorides difficult to crystallize, but traces of such products which probably do not exist in the plant are found in all typical hyoscyamine-yielding drugs.

Nicotine, Conine, and Sparteine, Tests to Differentiate. C. Reichard (*Pharm. Centralh.*, **46**, 309, 387.) Cuprous oxychloride is a reagent which serves to distinguish nicotine and sparteine. The reagent is easily prepared by moistening Cu_2Cl_2 with a little water, and heating until the mass acquires a bright green colour. A small particle of the Cu_2Cl_2O thus obtained is placed on a porcelain surface with a drop of either of the above alkaloids and a drop of HCl. With *nicotine* an immediate formation of a fine violet blue colour occurs, which is permanent; with *conine* the tint is bright green, slowly fading and finally disappearing; *sparteine* gives no immediate reaction. Another reagent is α-nitroso-β-naphthol, a few drops of a solution of which is evaporated on a porcelain surface and treated with a trace of the alkaloids. *Conine* gives a fine deep green colour, *nicotine* a yellowish brown tint. Solution of ammonium molybdate in H_2SO_4 gives a green colour with *nicotine*, and no reaction with *conine* or *sparteine*; the addition of a little ammonium persulphate to these mixtures causes that with *nicotine* to give a fine purple-violet tint, with *sparteine* and *conine* a deep yellow. *Nicotine* gives at first a yellow, then a reddish colour, with a mixture of potassium sulphovinate and H_2SO_4; *sparteine* and *conine* give no reaction. *Nicotine* gives a red colour with *sodium picrate*; its colour is unchanged by *sparteine* or *conine*; on adding H_2SO_4 the red colour of the nicotine mixture becomes yellow. On adding a little ammonium persulphate and a drop of strong solution of potassium sulphocyanide to either of the three alkaloids, *sparteine* gives a fine orange colour, *nicotine* affords no reaction; with *conine* a slight orange tint quite distinct from that of sparteine is formed. Ferric sulphocyanide, employed as follows, also serves to distinguish the alkaloids. A few drops of solutions of Fe_2Cl_6 and of KCNS are mixed on a porcelain surface, and the deep red liquid is spread out in a thin layer and allowed to evaporate. A small quantity of *nicotine* or conine added, with a very little water, to this residue gives a green colour; *sparteine* a very deep bluish or reddish violet. By substituting K_4FeCy_6 for the KCNS and treating the blue liquid in the same way, the dry residue gives with *conine* a greenish brown spot; with *nicotine* the spot is at first blue, then slowly changes to bright green; with *sparteine* the spot immediately assumes a pale violet colour. If a little KCNS be now added to the dry spots, no change occurs with conine or nicotine, but the sparteine spot becomes pale blue, passing to deep blue on drying.

Nicotine, Determination of, in Presence of Pyridine. J. A. Emery. (*Journ. Amer. Chem. Soc.*, **26,** 1113.) Since nicotine and tobacco products are frequently adulterated with pyridine, the following method has been devised for the determination of the former in presence of the latter. Five Gm. of the tobacco extract is treated with 10 c.c. of 10 per cent. alcoholic solution of soda and 40 c.c. of water; sufficient calcium carbonate is then worked in to produce an almost dry mass, which is then extracted with ether for 5 hours in a Soxhlet apparatus. The ethereal extract is distilled at a low temperature, the residue treated with 50 c.c. of N/10 NaOH solution, transferred to a distilling flask, and distilled with a current of steam until from 400 to 450 c.c. of distillate has been collected. This is then adjusted to 500 c.c. with water; an aliquot part is taken and titrated, in the usual manner, with acid, using methyl orange as indicator. The result gives the total bases, nicotine and pyridine. To determine the nicotine, a standard 1 per cent. solution of pure nicotine is prepared and standardized by titration. The optical rotation of this is then determined. Using a saccharometer with a 400 mm. tube one degree of deviation is found to be equivalent to 0·112 Gm. of nicotine in 100 c.c. of liquid. The optical deviation of a 1 per cent. solution thus being known, the amount of nicotine in a portion of the above distillate is readily determined polarimetrically. The difference between the amount of total bases and nicotine gives the pyridine.

Nitrogen Iodide. O. Silberrad. (*Proc. Chem. Soc.*, **20,** 193.) From the action of zinc-ethyl with nitrogen iodide, by which volatile paraffins, together with a white amorphous compound, from which ammonia and triethylamine were obtained on treatment with dilute acid and subsequent distillation with KOH, it is concluded that the formula for nitrogen iodide is $NH_3 : NI_3$, and that the action of zinc-ethyl proceeds according to the equation—

$$(1)\ NH_3 : NI_3 + 3Zn(C_2H_5)_2 = 3Zn(C_2H_5)I + NH_3 + N(C_2H_5)_3.$$

$$(2)\ 2NH_3 + Zn(C_2H_5)_2 = Zn(NH_2)_2 + 2C_2H_6.$$

(See also *Year-Books*, **1894,** 24 ; **1895,** 24 ; **1897,** 30 ; **1899,** 21, 22 ; **1900,** 20.)

Nitrogen, Presence of, and the Amount of Ash, in certain Medicinal Plants. L. F. Kebler. (*Proc. Amer. Pharm. Assoc.*, **52,** 367.) It has been noticed that dried stramonium leaves contain a large amount of nitrogenous matter ; in American-grown leaves this did not occur as nitrates, while imported leaves showed the presence of nitrates by the diphenylamine reaction. On the other hand, nitrates were present in American digitalis leaves, but not in the imported drug. In four samples of *Jaborandi* examined the total nitrogen ranged from 2·17 to 2·58 per cent. ; in only one of these were nitrates present ; the ash of these samples ranged from 5·15 to 10·41 per cent. In 26 samples of *Stramonium leaves* the nitrogen ranged from 3·60 to 5·98, and the ash from 9·26 to 22·72 per cent. *Stramonium seeds* gave 2·77 to 3·00 per cent. of nitrogen and 2·42 to 2·92 per cent. of ash. *Belladonna leaves,* in seven samples, gave from 1·03 to 5·42 per cent. of nitrogen and from 6·01 to 16·53 per cent. of ash. *Digitalis leaves,* from 2·70 to 2·83 per cent. of nitrogen, and from 11·13 to 25·31 per cent. of ash. *Nux vomica,* from 1·26 to 1·46 per cent. of nitrogen, and 1·29 to 1·94 per cent. of ash. *Coca leaves,* 2·57 to 3·26 per cent. of nitrogen, and 9·24 to 12·46 per cent. of ash. *Calabar bean,* 2·90 to 3·24 per cent. of nitrogen, and 3·75 to 4·24 per cent. of ash. *Ipecacuanha,* from 1·56 to 1·78 per cent. of nitrogen, and 1·73 to 3·03 per cent. of ash. (For previous records of ash of drugs, see *Year-Books*, **1900,** 403 ; **1902,** 176 ; **1903,** 244.)

Nut Oil, Detection of other Oils in. J. Bellier. (*Annales de Chim. Analyt.*, **10,** 55.) The adulterant most difficult to detect in nut oil is poppyseed oil ; but since the fatty acids of the latter are much less soluble in alcohol at a low temperature than those of the former, sophistication may be detected as follows. A solution of glacial acetic acid, 1 volume, in water, 3 volumes is prepared ; also a solution of pure KOH 16 Gm. in alcohol, 90 per cent. 100 c.c. The acid solution is set against the alcoholic alkali, using phenolphthalein as indicator, and the equivalents noted. Exactly 1 c.c. of the oil to be tested is carefully run into a test-tube and 5 c.c. of the alcoholic KOH solution is added to it. A control test is performed, side by side with pure nut oil. The two tubes are then heated to near boiling, but avoiding absolute ebullition until the oils are dissolved. They are then corked and kept at 70°C. in the water-bath for half an hour ; each is then treated with exactly that quantity of acetic acid solution which is equivalent to the 5 c.c. of alcoholic KHO taken. The tubes are again corked, stood in water at about 25°C., and when they are uniform in temperature placed side by side in water maintained at 17–19°C. Pure nut oil under these conditions requires a considerable time to show a scanty separation ; poppy oil, on the contrary, rapidly forms a precipitate which will be suspended in the whole liquid ; other oils give an almost immediate separation of fatty acids, and with some the liquid in the tube is quite solidified. This test will detect all other oils mixed with nut oil except poppy oil in the proportion of a few percentages : it is less sensitive for poppy oil ; with practice 10 per cent. may be detected, but above 15 or 20 per cent. the evidence it affords is unmistakable.

Nutmeg, Essential Oil of, the B.P. Characters for. (*Schimmel's Report, Oct.*, **1904,** 66.) Attention is directed to the fact that the B.P. limits of sp. gr. for nutmeg oil, " 0·870 to 0·910 at 15°C.," excludes from use oil distilled from the best nutmegs, since it is only wormy low-grade nuts which yield an oil of this character. It is remarked that " a radical elimination of such contradiction, which, unfortunately, does not stand alone, is greatly to be desired." The nominal characters of the oil are sp. gr. at 15°C. 0·870 to 0·920 ; $[\alpha]_D + 11^\circ$ to $+30^\circ$; solubility in alcohol, 90 per cent. 1 : 1 to 1 : 3. An oil from specially good nutmegs was found to have the sp. gr. 0·922 at 15°C. $[\alpha] + 7^\circ 52'$; solubility in alcohol, 90 per cent. 2 : 1.

Ocimum basilicum, Essential Oil of. P. von Romburgh, and C. J. Enklaar. (*Schimmel's Report, Oct.* **1904,** 14.) P.

von Romburgh has detected a new terpene, $C_{10}H_{16}$, ocimene which resembles myrcene in obsorbing oxygen with readiness and becoming converted into a colourless viscid body; but it differs from myrcene in physical characters. Enklaar finds that by reduction with sodium, in alcoholic solution, a dihydro-ocimene is obtained, which forms a crystalline bromo additive product distinct from that of myrcene.

Op'um Alkaloids, Certain, Criticism of the Official Monographs on. D. B. Dott. (*Pharm. Journ.* [4], **20,** 230.) *Apomorphine Hydrochloride.* The solubility in water is more fairly described as 1 in 53. The solubility in 90 per cent. alcohol might be given as 1 in 48.

Morphine Acetate. Better described as soluble 1 in 3 parts of water. The sentence about recrystallizing from hot water might be deleted.

Morphine Hydrochloride. This is better described as soluble in 25 parts of water, and 1 in 70 of alcohol (90 per cent.). It is impossible to obtain 1·51 Gm. of anhydrous morphine by precipitating with ammonia from 2 Gm. of salt, because the alkaloid is more soluble in ammonia solution and in solution of ammonium salts than it is in water.

Opium, and Tincture of Opium, Morphinometric Assay of. D. B. Dott. (*Pharm. Journ.* [4], **20,** 230.) The following modification of the official method is suggested:—

Take 8 Gm. of opium, digest with 20 c.c. of warm water, transfer to a small calico filter, wash with successive portions of water, finally pressing the filter with its contents, so as practically to exhaust in 80 c.c.; add 3 Gm. slaked lime, allow to mix and make up volume to 82 c.c. After thorough mixing, allow to stand half an hour, filter, collect 50 c.c. in a flask, add to the filtrate 5 c.c. alcohol and 30 c.c. of ether; shake the mixture, add 2 Gm. ammonium chloride, shake frequently during half an hour, set aside for eighteen hours, then decant the ether through two counterpoised filters, transfer the precipitate to the same, using water saturated with ether for this purpose, wash the filter twice or thrice with ether-water, press in bibulous paper, dry at about 70° to 80°C., and weigh the precipitate. Titrate a weighed portion of the precipitate with decinormal acid, and calculate the equivalent of the whole precipitate to anhydrous morphine. To the number so obtained add 0·04, and multiply the sum by 2. The product will represent the percentage of anhydrous morphine in the opium.

In the case of tincture, evaporate 80 c.c. to 30 c.c., dilute (adding 3 Gm. slaked lime) to 82 c.c., and proceed further in the same manner as described under opium. The number finally obtained will represent the proportion in grammes of anhydrous morphine present in 100 c.c. of tincture.

Opium, Suggested Process for the Morphinometric Assay of, for the Future French Codex. A. and Albert Petit. (*Journ. Pharm. Chim.* [6], **21,** 107.) Fifteen Gm. of opium is weighed off from an average sample and triturated in a mortar with 6 Gm. of slaked lime until evenly mixed; it is then thoroughly rubbed down with water 150 c.c., and left in contact for 2 hours with occasional stirring. The mixture is then thrown on a filter and 106 c.c. of filtrate collected, which will correspond to 10 Gm. of the original opium. To this liquid 30 c.c. of ether is added and the mixture thoroughly shaken to saturate the aqueous portion; AmCl, 2 Gm. free from carbonate is then added, with thorough agitation, until a distinct precipitate is formed. The mixture is then set aside for 24 hours in a precipitating flask, well closed with a piece of ground glass, to prevent the volatilization of the ether. The ether layer is then decanted on to 2 small counterpoised filters, and the aqueous liquid again agitated with another 30 c.c. of ether, which is passed through the same filter, followed by the aqueous mother liquor, all crystals adherent to the sides of the flask being detached and transferred to the filter by means of this mother liquor. The precipitate and filters are then washed with 20 to 30 c.c. of morphine-saturated water by means of a fine pointed pipette. Then dry the filters for 2 hours at 100°C., and wash when cold with about 20 c.c. of pure $CHCl_3$, previously deprived of alcohol by shaking out with water. Finally dry again at 100°C., and weigh. The weight obtained is the amount of monohydrated morphine contained in 10 Gm. of opium.

Opoponax Oil. (*Schimmel's Report, Oct.,* **1904,** 67.) The essential oil obtained by steam distilling the gum resin of *Balsamodendron kafal* had the sp. gr. 0·895; $[a]_D$ −12° 35′; saponification value, 14·5; solubility in alcohol 90 per cent., 1 : 1, not quite clear with 1 : 8. When acetylized the increase in the saponification value was observed, indicating the presence of an alcohol. On distillation in vacuo the portion which did not distil between 45–130°C. under 3 mm. gave a phthalic acid ester, which, when saponified, liberated a colourless alcohol extremely difficult to volatilize with steam. This appeared to be a mixture of sesquiterpene alcohols. It had a marked odour of opoponax. The volatile fraction of the above gives a sesquiterpene, the crystalline hydrochloride of which melted at 80°C. and had the composition $C_{15}H_{24}.3HCl$. The sesquiterpene regenerated from this hydrochloride had the sp. gr. 0·8708 at 15°C. ; was optically inactive ; b.p. with decomposition, 260–285°C. at normal pressure ; $[n]_D$ $_{260}$ 1,48873.

Oregon Balsam, from Pseudotsuga mucronata, Essential Oil of. F. Rabak. (*Pharm. Review*, **22,** 293.) The balsam examined, derived from the above source, yielded on steam distillation 25 per cent. of an essential oil, the bulk of which distilled over below 160°C. The oil has a pleasant turpentine-like odour. The sp. gr. fluctuated in different distillations between 0·822 and 0·873, whilst the difference in the angles of rotation was but slight ($[a]_D$ −34° 37′ to −39° 55′). In fractionating the essential oil, 71·8 to 83·4 per cent. passed over up to 160°C. ; from this portion relatively pure l-pinene was obtained by a second fractional distillation. The l-pinene was identified as such by conversion into pinene nitrosochloride, nitrosopinene, and pinene nitrol benzylamine. (See also *Year-Book*, **1904,** 197.)

Oregon Balsam from Abies amabilis. F. Kabak. (*Pharm. Review*, **23,** 46.) This oleoresin, resembling Canada balsam in appearance, is a thinnish fluid with a marked limonene-like odour. Sp. gr. 0·969 at 22°C. ; acid value, 44 ; optically inactive. It yields 40·3 per cent. of a colourless oil ; sp. gr. 0·852 at 22°C. ; $[a]_D - 12°\ 17'$; it contains lævo-pinene and probably lævo-limonene.

Oxalic Acid, New Synthesis of. H. Moissan. (*Comptes rend.*, **140,** 1209.) When dry carbonic acid gas is passed over potassium hydride at 54°C., potassium formate has been shown to be formed (*Year-Book*, **1902,** 84). It is now found that when the combination takes place at 80°C. potassium oxalate is produced according to the formula—

$$2KH + 2CO_2 = K_2C_2O_4 + H_2.$$

This reaction has been proved, not only by the characteristic reactions of the acid liberated, but also by measuring the volume of hydrogen produced.

Oxymethyl-anthraquinone Constituents in Purgative Drugs, Determination of. — Christofoletti. (*Pharm. Centralh.*, **45,** 725.) Applying the colorimetric method of Tschirch (p. 145) to drugs other than rhubarb, the following results were obtained :—

Cort. Rhamni Frang., 4·5–5 per cent. ; *Cort. Rhamni Frang.* (in fine powder), 5 per cent. ; *Cort. Rhamni Purshian.*, 1·4–2 per cent. ; *Cort. Rhamni Purshian.* (in fine powder), 1·6 per cent. ; *Fruct. Rhamni Cathart.*, 0·76 per cent. ; *Fol. Sennæ Alexand.*, 1 per cent. ; *Fol. Sennæ Indicæ*, 1·2 per cent ; *Folliculi Sennæ*, 1·33 per cent.

In the examination of aloes the following modified process was used : 5 Gm. of the aloes was dissolved in 50 c c. of alcohol, 30 per cent., without warming. This solution was shaken out with benzol, successive portions, until the benzol solution separated colourless. The bulked benzol extract was then shaken out with successive washings of AmOH solution, 10 per cent., until these showed no more red colour. The bulked ammonia solution was then diluted with distilled water to 1 litre and tested colorimetrically against the standard emodin solution. In order to obtain a bright red colour for comparison the diluted solution should be treated with 10 c.c. of AmOH. The different varieties of aloes examined gave the following figures :—

Aloe lucida cap., hard, 0·08 per cent. ; Aloe lucida cap., soft, 0·2 per cent. ; Uganda Aloes (new method), 0·5 per cent. ; Barbados Aloes, 1·0 per cent. ; Barbados Aloes (new method), 0·33 per cent. ; Curaçao Aloes, 0·8 per cent.

Palm Oil, Detection of, in other Oils. C. A. Crampton and F. D. Simons. (*Journ. Amer. Chem. Soc.*, **27,** 270.) Palm oil is often used as a colouring material for other fats or oils ; its presence may be detected by either of the two following reactions :—

First Method. One hundred c.c. of the fat is dissolved in 300 c.c. petroleum ether, and shaken out with 50 c.c. of 0·5 per cent. potassium hydroxide. The watery layer is drawn off, made distinctly acid with hydrochloric acid, and shaken out with 10 c.c. of carbon tetrachloride. The carbon tetrachloride *solution is separated and part of it tested with the following* **reagent**: *Two c.c. of a mixture of 1 part crystallized phenol in* 2 parts carbon tetrachloride is added to it in a porcelain crucible, then 5 drops of hydrobromic acid (sp. gr. 1·19), and the contents mixed by gently agitating the dish. The almost immediate development of a bluish green colour is indicative of palm oil.

Second Method. Ten c.c. of the melted and filtered fat is shaken with an equal volume of acetic anhydride (chemically pure and colourless), then 1 drop of sulphuric acid (sp. gr. 1·53) is added, and the mixture shaken a few seconds. If palm oil be present, the lower layers on settling out will be found to be coloured blue with a tint of green.

The test was applied to all the oils and fats ordinarily used for edible purposes, and none were found to give the characteristic colour, except that sesame oil and mustard oil gave colours which might be confused with the colour obtained from palm oil. Fortunately, these are not oils having a high natural colour, consequently they would be present, if at all, in some considerable quantity, and their presence may easily be demonstrated by characteristic tests; the sesame oil by the furfural reaction, and the mustard oil by the high refractive index of the fatty acids extracted by the alkali solution.

The colouring matter in sesame oil, which is the cause of this colour reaction, may also be separated by repeated extractions with alcohol, when the oil left will not give the blue colour. A similar number of extractions of cotton oil containing 1 per cent. of palm oil had no effect on the formation of the colour.

Bleached palm oil does not respond to either reaction.

Palmarosa Oil, Occurrence of Methyl-heptenone in. (*Schimmel's Report, May*, **1905**, 47.) The presence of methylheptenone in palmarosa oil suspected by Gildemeister and Stephan is confirmed. The first 5 kilos derived from distilling 350 kilos of oil was fractionated at normal pressure. Methylheptenone was found in the fraction boiling between 170°–180°C.

Paraphenylenediamine in Hair Dyes, Detection of. J. Thomann. (*Schweiz. Woch.* **42**, 680.) It has been found that the use of hair dye containing paraphenylenediamine is most injurious, producing a troublesome eczema of the scalp. It may be isolated by shaking out with ether, but thus obtained, it is contaminated by oxidation products. These may be obviated by the addition of ammonium sulphydrate. On evaporating the ether the paraphenylenediamine occurs in long needles, m.p. about 140°. Its solution in HCl, treated with excess of NaClO, gives a white flocculent precipitate crystallizing from dilute alcohol in long needles, m.p. 124°C. When gently heated with solution of SH_2 and Fe_2Cl_6 a violet colour is produced. A very dilute solution, treated with aniline and Fe_2Cl_6, gives a blue colour.

Patchouli Oil, Constituents of. (*Schimmel's Report, May,* **1905,** 60.) One of the bases previously recorded (*Year-Book,* **1904,** 132) as occurring in patchouli is now found to have the formula $C_{14}H_{23}NO$, forming by long standing a crystalline hydrochloride, m.p. 147·5 to 148·5°C. It forms a crystalline platinochloride $(C_{14}H_{23}NO.HCl)_2PtCl_4$, m.p. 175°C. H. von Soden and W. Rojahn (*Berichte,* **37,** 3354) have isolated by repeated fractionation two sesquiterpenes. One of these, $C_{15}H_{24}$; b.p. 264–265°C. under 750° mm.; $[\alpha]_{D20}-58^\circ\ 45'$; sp. gr. at 15°C., 0·9335. The second sesquiterpene boiled at 273–274°C. under 750 mm.; it had the sp. gr. 0·930 at 15°C. and the $[\alpha]_D+0^\circ\ 45'$. Neither gave a crystalline hydrochloride. They were unable to find the cadinene reported by Wallach as occurring in the oil.

Peppermint Oil, French. (*Schimmel's Report, May.* **1905,** 62.) Although French oil of peppermint is not exported, considerable quantities are produced and consumed in France. Three specimens examined differed very widely in character, as shown by the following figures: *No.* 1. Sp. gr. 0·9249; $[\alpha]_D-5^\circ\ 20'$; menthol as esters, 9·95; total menthol, 45·75 per cent. Insoluble in 10 vols. of 70 per cent. alcohol; soluble 1 : 1·1 vol. of 80 per cent. alcohol. *No.* 2. Sp. gr. 0·9108; $[\alpha]_D-17^\circ\ 46'$; menthol as esters, 10·32; total menthol, 50·82; insoluble in 10 vols. of 70 per cent. alcohol; soluble 1 : 1·2 in 80 per cent.; opalescent with more than 4 vols. *No.* 3. Sp. gr. 0·912; $[\alpha]_D-35^\circ\ 18'$; menthol as esters, 20·8; total menthol, 69·26; soluble, 1 : 3·5 and more of alcohol 70 per cent., with faint opalescence.

Peppermint Oil, Javan. P. van der Wielen. (*Apoth. Zeit.,* **19,** 930.) The oil is distilled from *Mentha javanica* Bl. (*Mentha lanceolata* Benth.), is green in colour and has a pleasant odour not resembling peppermint, and a bitter taste. It contains much pulegone and little or no menthol or menthone.

Peppermint Oil, Sicilian. J. C. Umney and C. T. Bennett. (*Chem. and Drugg.*, **66,** 945.) The oil examined was derived from black Mitcham peppermint plants, cultivated in Sicily. The peppermint plant appears to grow luxuriantly in Messina, and blossoms early. In this country the oil is usually distilled from the plant before it reaches that stage, and it rarely flowers in England. Two distillations have been made in Messina from the fresh herb. The sample of oil No. 1 was distilled in July, when the plants were in full bloom, while No. 2 was a second distillation from herb which had by no means reached the full development of its second growth (the growth of the herb in the autumn being very slow), when there was no indication of flower-buds. The yield of oil from the second crop was only one-third of that obtained from the first. This low yield was partly due to the effects of an early winter.

Sample No. 1, distilled in July, 1904 (yield 0 4 per cent.), had the following characters: Sp. gr., 0·908; optical rotation, −14°; total menthol, 40·0 per cent.; free menthol, 36·2 per cent.; esters calculated as menthyl acetate, 4·8 per cent.

The oil was soluble in 4 volumes of 70 per cent. alcohol, although it had not been rectified, but did not solidify when immersed in a freezing-mixture, even after the addition of a crystal of menthol and stirring.

It will be seen that the percentage of menthol in the oil is very low, the proportion of esters of menthol being small also, but in fair ratio to the total amount of menthol present.

Sample No. 2, distilled from the second crop of peppermint in December, 1904, had the following characters: Sp. gr. 0·920; optical rotation, −23°; total menthol, 70·5 per cent.; free menthol, 47·4 per cent.; esters calculated as menthyl acetate, 29·4 per cent.

The oil was not soluble in 70 per cent. alcohol, although it had been rectified, but was soluble in 2 volumes and upwards of 80 per cent. alcohol. The unusual amount of esters probably accounts for the insolubility in 70 per cent. alcohol. The proportion of esters recorded is extremely high—higher than in any sample of peppermint oil previously examined, and even more than double that of the white peppermint oil examined in 1896 (*Year-Book*, **1896,** 148). As might be inferred, the high proportion of esters appears to prevent the separation of menthol (notwithstanding its apparently high percentage) when immersed in freezing-mixture.

The oil possesses a markedly pleasant taste, and agrees very much in character with the finest white peppermint oil. Of course, the low yield would make it a comparatively expensive product, but, as it seems to have been a cold season, better results may be looked for this year.

Incidentally, it is noted that a specimen of white peppermint oil which has been kept for 6 years now contains 19·4 per cent. of esters.

Perborates. J. Bruhat and H. Dubois. (*Annales de Chim. Analyt.*, **10,** 135.) Perborates differ from borates in containing an additional molecule of oxygen. Although this oxygen is very stable in crystalline perborates containing several mols. of crystal water, it is immediately evolved on warming, or in the presence of an excess of water, also in the presence of free acid. The nascent oxygen thus liberated combines with the water, forming hydrogen peroxide. In a neutral or alkaline solution only the dissolved perborate parts with its oxygen; that which remains insoluble is not decomposed; but if MnO_2 be added to the mixture the whole of the perborate, both in solution and undissolved, is decomposed. The same reaction takes place with certain organic ferments, such as the oxydases. When treated with cold strong H_2SO_4 the perborates give a very strong solution of H_2O_2, which decomposes spontaneously, forming ozone. They liberate iodine from KI, although they are alkaline in reaction, and decompose $KMnO_4$ like H_2O_2. They readily convert protoxides into the higher state, but do not always form perborates of the metals. Ferrous salts are converted into ferric, and, in alkaline solution, precipitate Fe_2O_3. Mercurous salts give yellow HgO; Pb2HO forms red hydrated plumbic plumbate. With nickel, basic perborates of a fine green colour are obtained; zinc, calcium, magnesium, barium and strontium give white perborates more or less insoluble, of varying composition according to the conditions under which they are formed.

When a solution of potassium biborate in H_2O_2 is cautiously precipitated with alcohol, crystals of biperborate of potassium, $KB_2O_5.2H_2O$, are formed; 1 Gm. of this salt dissolved in water gives 12·6 c.c. of solution H_2O_2 of 10 volumes. When dried over P_2O_5 it loses 1 mol. H_2O.

With ammonia, several perborates are formed, of which $NH_4BO_3.H_2O$ contains 16·84 per cent. of active oxygen.

Sodium perborate, $NaBO_3.4H_2O$, may be obtained either by the electrolysis of a solution of orthoborate, by precipitating the same with H_2O_2, or by saturating a solution of sodium peroxide with boric acid. When cautiously dried it gradually loses water and finally forms the very stable monohydrated salt $NaBO_3.H_2O$, which contains 16 per cent. of active oxygen, and 1 Gm. gives with water 11·13 c.c. of hydrogen peroxide of 10 volume strength. It is not very soluble in water, about 1 : 40 at 20°C. The solubility is increased by the presence of boric, citric, and tartaric acids. It is more soluble in glycerin. It becomes anhydrous when dried over P_2O_5, and then contains 45·158 per cent. of active oxygen.

Peruvian Balsam, White. H. Thoms and A. Biltz. (*Oesterr. Zeits. für. Pharm.* 58, 943, through *Schimmel's Report, May,* **1905.**) The so-called " white Peru balsam " affords by precipitation from alcohol an amorphous body melting at 120°–130°, myroxocerin. By extraction with 5 per cent. soda solution, cinnamic acid (m.p. 133°), and a compound insoluble in alkalies, which crystallized in white needles but was not further identified, and which melts at 270° with decomposition, were isolated. After these bodies had been separated from the ethereal solution, myroxol was removed by means of KOH, the residue saponified after distilling off the ether, and the volatile constituents then steam distilled. The yellow distillate thus obtained was split up by fractionating *in vacuo* (100 mm.) into an oil and a residue solidifying in crystalline form (55 per cent.) which was found to be cinnamic alcohol (m.p. 33°). The oil purified by repeated fractionating passed over constant at 112° (10 mm. pressure) as a colourless, strongly refractive liquid with a pleasant odour. Phenyl-propyl alcohol and a hydrocarbon with an odour like cedarwood were also detected. Benzyl alcohol and peruviol, important constituents of the ordinary Peruvian balsam, were not found in the white balsam.

Phellandrium Aquaticum, Essential Oil of. (*Schimmel's Report, Oct.,* **1904,** 88.) In addition to phellandrene, this oil is found to contain a new aldehyde, phellandral, $C_{10}H_{16}O$, isomeric with citral, having an odour similar to that of cuminal.

It boils at 89°C. under 5 mm.; sp. gr. 0·9445 at 15°; $[a]_D -36° 30'$; $[\eta]_D$ 1,4911; m.p. of semicarbazone, 204°C. When exposed to the air phellandral readily oxidizes into a crystalline acid, $C_{10}H_{16}O_2$, m.p. 144–145°C. With permanganate another dibasic crystalline acid, $C_9H_{16}O_4$, m.p. 70–72°C., is obtained. From the non-aldehydic portion of the oil a new alcohol, androl, $C_{10}H_{20}O$, was isolated by refractionation *in vacuo*. This appears to be the chief odorous constituent of the oil. The higher boiling fractions contain another alcohol in minute quantity, which has a rose-like odour.

Phosphorescent Zinc Sulphide. H. Gruene. (*Berichte*, 37, 3076.)—Absolutely pure ZnS does not exhibit phosphorescence, but it is developed by traces of other metals, such as Cu, Ag, Mn, Pb, Bi, Sn, U, and Cd. The presence of less than 0·0001 of Cu gives rise to a magnificent green glow; with Mn the light is orange. This is produced by crushing or friction.

Phosphoric Acid, Determination of, in Alimentary Substances. E. Fleurent. *Annales de Chim. Analyt.* **10.** 1. Garola has shown that the usual method of determining the amount of phosphates in food stuffs from the quantity of P_2O_5 in the ash gives results which are notably below the truth. He has proposed a method analogous to that of Kjeldahl, with subsequent precipitation and weighing as phosphomolybdate. The author advocates the use of the following process as being more accurate and convenient. If the substance contain much moisture it is first dried; 10 or 20 Gm. is introduced into a conical 300 c.c. flask and covered with 50 or 100 c.c. of HNO_3; sp. gr. 1·48. The mixture is gently heated, with agitation to break up the frothing; when action moderates, evaporation is allowed to proceed, and finally the whole is carried to dryness at 110–120°C. in a drying oven. The residue is then treated with 15 to 20 c.c. of H_2SO_4 (2 volumes of acid, sp. gr. 1·767, and 1 volume of fuming acid), 1 Gm. of Hg, and then heated as in Kjeldahl's method. When all the organic matter has been destroyed, the residue is cautiously diluted, neutralized with ammonia, and transferred to a precipitating flask, using the following solution to wash out the flask: Solution of ammonia, 50; AmCl, 20; distilled water to 100. The liquid is then precipitated in the ordinary way with magnesium mixture and the P_2O_5 weight as $Mg_2P_2O_7$.

Picramic Acid, New Process for Preparation of, and Determination of Potassium by Means of. A. Frebault and J. Aloy. (*Journ. Pharm. Chim.* [6], **20,** 245.) The method hitherto employed for producing picramic acid, or dintraminophenol, consists in the reduction of picric acid in alcoholic solution by means of Am_2S. The following method is more convenient and gives better results. An aqueous or methylic alcohol solution of picric acid is treated with zinc dust, and made alkaline with AmOH; the mixture is then boiled for an hour, the excess of AmOH being maintained. The deep red liquid is then concentrated on the water-bath, to drive off the excess of AmOH, a slight excess of acetic acid is added, and evaporation continued to dryness. The residue is taken, redissolved in boiling water, filtered and crystallized, when it forms fine pomegranate-red crystals, m.p. 165°C. Picramic acid when suddenly heated burns quickly without detonation; it precipitates neither peptones, albumoses, albumin, nor alkaloids, reactions which differ widely from those of picric acid. Like picric acid, it gives bromopicrin, $CBr_3(NO_2)$, when treated with sodium hypobromate. With alkali bases it forms salts of a fine red colour, which turn to pale greenish yellow in the presence of free acids. These salts may, therefore, be used as indicators for alkalimetry. *Potassium* may be determined colorimetrically in the form of potassium picramate. A few c.c. of solution of the salt to be tested is treated with an equal volume of alcohol and precipitated by means of sodium picrate in excess. The precipitate is collected, washed with strong alcohol, dissolved in boiling water, and converted into picramate by means of glucose in the presence of ammonium carbonate. The tint of the red solution thus obtained is then matched with that of previously prepared standard solutions containing from known quantities of KCl. The therapeutic properties of the compound are under investigation.

Pilocarpine, Substances having Analogous Constitution to. H. A. D. Jowett. (*Proc. Chem. Soc.*, **21,** 116.) In attempting to prepare substances having an analogous constitution to pilocarpine the following compounds were isolated :—

4 : 5-*Dimethylglyoxaline,* $C_5H_8N_2$, previously prepared by Kuenne; b.p. 165°C. under 10 mm. Its *nitrate* melts at 180°C. and its *picrate* at 196–197°C.

1 : 4 : 5-*Trimethylglyoxaline,* $C_6H_{10}N_2$; b.p. 117° under 20 mm.

crystallizing in needles ; m.p. 46°C. The *nitrate*, $C_6H_{10}N_2HNO_3$, H_2O forms long needles; m.p. 46°C. The *hydrochloride*, $C_6H_{10}N_2HCl,H_2O$, in needles which become anhydrous at 110°C. or over H_2SO_4, then melts at 199°C. The *aurichloride* occurs in yellow needles, m.p. 202° ; the *platinochloride* has the m.p. 224–225°C., the *picrate* m.p. 218°C., and the *methiodide* m.p. 158°.

2-*Bromo*-1 : 4 : 5-*Trimethylglyoxaline*, $C_6H_9N_2Br,2H_2O$, obtained by the bromination of trimethylglyoxaline, crystallizes from hot water in long silky needles, m.p. 49°C. When anhydrous it melts at 83°C. Its *hydrobromide* in cubical crystals melts at 208°C., the *aurichloride* at 191°C., and the *picrate* at 173°C.

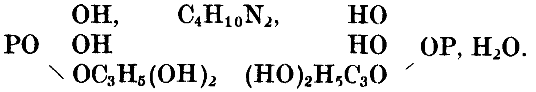
Pine-tar Oil, Finnish. E. Lundwik. (*Pharm. Centralh.*, **45,** 859.) What is known in Finland as " crude oil of turpentine " is not, strictly speaking, turpentine oil at all, but crude tar oil, since it is a by-product in the destructive distillation of the wood of *Pinus sylvestris.* It is widely used in Finland both for medicinal and technical purposes. It differs from true turpentine oil in its dark colour, empyreumatic odour and greater toxic action, so that it is less suitable for internal administration for instance, as an antidote for phosphorus. It has but slight affinity for chlorine or iodine, does not absorb much oxygen, and contains only a small amount of pinene. It is chiefly used in medicine as a popular remedy for catarrhal and rheumatic affections ; also as a vermifuge, but for the latter purpose is not to be recommended, since doses of a dessertspoonful may occasion severe renal irritation.

Pinus Sylvestris Buds, Essential Oil of. (*Haensel's Report, April,* **1905,** 19.) The fresh male and female inflorescences of *Pinus sylvestris* gives oil of a different character according to the method of distillation. The oil obtained by *direct steam distillation* had the following characters : Sp. gr. 0·8839 ; $[\alpha]_D -22°$; saponification value, 19·5 ; acetyl value, 58 ; solubility in alcohol 80 per cent., 1 : 20. The oil obtained by *cohobation* is darker in colour than the above, and has the following characters : Sp. gr. 0·9588 ; $[\alpha]_D -5·44$; saponification value, 33 ; acetyl value, 145 ; solubility in alcohol 80 per cent., 1 : 15. These figures are equivalent to 6·8 per cent. of bornyl acetate and 16·68 per cent. of borneol in the directly distilled oil; and to 11·55 per cent. of bornyl acetate and 44·74 per cent. of borneol in the cohobation oil.

Pinus strobus, Essential Oil of. Troeger and Bentin. (*Schimmel's Report*, *May*, **1905,** 66.) The essential oil from the young shoots of *Pinus strobus* has the sp. gr. 0·9012; $[\eta]_D$ 1·48274; $[\alpha]_D - 19{\cdot}8°$; ester content, 8·4 to 8·9 per cent.; acetyl value, 15·25 per cent.

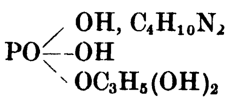
Piperazine Glycerophosphates. A. Astruc. (*Comptes rend.*, **140,** 727.) *Piperazine acid glycerophosphate* is obtained by evaporating on the water-bath 2 molecular equivalents of glycerophosphoric acid and 1 equivalent of piperazine. The product is a syrupy transparent paste, slowly soluble in water in all proportions. Its solutions are neutral to helianthin and acid to phenolphthalein.

Neutral piperazine glycerophosphate is obtained in a similar manner with equal equivalents of acid and base, by precipitating the aqueous solution of the acid glycerophosphate with alcohol, or by mixing alcoholic solutions of acid and base in equimolecular equivalents. The first two methods give an amorphous product in the form of a white powder; the third yields the salt in crystalline scales which are stable at 100° and melt at 155°C. with decomposition The acid glycerophosphate has the formula—



$$\mathrm{PO}\begin{array}{l}\mathrm{OH,}\\ \mathrm{OH}\\ \diagdown\,\mathrm{OC_3H_5(OH)_2}\end{array}\quad\begin{array}{c}\mathrm{C_4H_{10}N_2,}\\ \\ \mathrm{(HO)_2H_5C_3O}\end{array}\begin{array}{r}\mathrm{HO}\\ \mathrm{HO}\\ \diagup\end{array}\ \mathrm{OP,\,H_2O.}$$

The neutral salt may be expressed as—



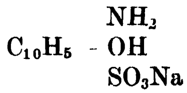
$$\mathrm{PO}\begin{array}{l}\diagup\,\mathrm{OH,\,C_4H_{10}N_2}\\ -\mathrm{OH}\\ \diagdown\,\mathrm{OC_3H_5(OH)_2}\end{array}$$

The latter is acid to phenolphthalein and alkaline to methyl orange.

Podophyllum, peltatum, Fatty Oil of. A. R. L. Dohme and H. Engelhardt. (*Proc. Amer. Pharm. Assoc.*, **52,** 340.) The fatty oil obtained in the course of the manufacture of podophyllum resin has the following characters after heating on the water-bath to drive off water and solvent: Sp. gr., 0·9753; acid value, 40·6 to 41; saponification value, 182·7 to 185·4; iodine value, 99·6 to 101. When treated with about 4 volumes of light petroleum spirit a heavy flocculent precipitate was obtained; but it was soluble in alcohol and in other organic solvents. To separate the insoluble portion, the chloroformic solution was mixed with a large volume of petroleum ether; the flocculent precipitate formed aggregated to a yellow resinous mass, which was not crystallizable, nor could it be further purified; it appears to be an indifferent body, becoming darker in colour on heating or exposure to the air. After the removal of this substance the oil had the sp. gr. 0·952; acid value, 39·9 to 40·2; saponification value, 159 to 160·5; and iodine number, 106·8 to 107·4. Among the non-saponifiable constituents, phytosterin, $C_{26}H_{41}O + H_2O$, m.p. 131°C., and a body giving colour reactions similar to cholesterol, crystallizing in prisms m.p. 118°C., were obtained. Oleic and oxyoleic acid were found to be present in the saponifiable portion; but although the original oil showed marked drying properties, no linoleic was isolated. The lead soap insoluble in benzene yielded a crystalline fatty acid, m.p. 52–55°C., which has not been identified. The acid liquid after removal of the fatty acids contained glycerin and acid, possibly valerianic acid.

Polyphenols, New Colour Reaction for. E. P. Alvarez. (*Chem. News*, **91**, 124.) Hydrate of sodium dioxide, $Na_2O_28H_2O$, is the reagent used for polyphenols, their isomers and higher organic compounds. It is produced by the action of cold water on pure sodium dioxide in the presence of alcohol or ether. The test is thus applied. 0·2 Gm. of pure Na_2O_2 is placed in a small porcelain capsule, with 0·04 or 0·05 Gm. of the polyphenol to be tested, and then 5 c.c. of absolute alcohol; after gently rotating the liquid for 4 or 5 minutes 15 c.c. of cold water is added. The water must not be added before the alcohol, or the mixture will ignite. *Pyrocatechin* thus treated gives a transitory pale pink, changing to green, then brown. *Resorcin* gives a pale yellow colour, becoming greenish; the green colour deepens and becomes permanent. *Hydroquinone* forms, at once, an intense reddish yellow colour; a thin film of the yellow mixture when blown upon shows a transitory blue colour at the edges. On adding more water a persistent orange tint is produced. *Pyrogallol* at once assumes a reddish brown or dull red colour, becoming intense red with yellow edges and finally orange in two hours. *Oxyhydroquinone* forms a reddish violet shade and a black deposit with brown liquid. *Phloroglucin* gives a blue violet colour, increased by adding water. *Orcin* at once gives an intense pink shade, and after adding water the colour resembles that of infusion of roses. *Homopyrocatechin* produces a blue violet tint changing to red; on adding water the liquid becomes reddish brown with yellow edges. *Thymohydroquinone* at once forms an intense orange colour, becoming wine red on addition of water.

Potassium, New Reagent for. E. P. Alvarez. (*Comptes rend.*, **140,** 1186.) A freshly prepared 5 per cent. aqueous solution of icononogene or sodium amidonaphthol sulphonate—



$$C_{10}H_5 - \begin{matrix} NH_2 \\ OH \\ SO_3Na \end{matrix}$$

is employed as a precipitant for potassium. The alkali should first be converted into chloride. The reagent may be employed in the presence of ammonium salts, and also in those of magnesium, if these be not in sufficient quantity to precipitate with ammonium carbonate. It is at least as delicate a reagent as platinic chloride, and is available in many cases where that and other potassium precipitants cannot be applied. Since the crystals of potassium amidonaphthol sulphonate form large characteristic or thorhombic pearly lamellæ, the reagent is valuable for the microchemical detection of the metal. With dilute solutions the reaction is not very rapid; thus 1 c.c. of a 1 per cent. solution of HCl will only show the formation of the white precipitate of amidonaphthol sulphonate after standing for several hours. Ferric and manganous salts are not precipitated by the new reagent, but nickel, cobalt and bismuth are thrown down, so is copper, but the precipitate is redissolved in an excess of the reagent.

Potassium Percarbonate as a Source of Oxgyen and of Hydrogen Peroxide. P. Lami. (*Apoth. Zeit.*, through *Journ. Pharm. Chim.* [6], **20,** 65.) Potassium percarbonate is prepared by the electrolysis of a saturated solution of potassium carbonate. The solution, at first clear, becomes milky, and finally deposits the percarbonate. Potassium percarbonate, when perfectly dry, is stable at ordinary temperatures; when heated to about 200° it decomposes according to the equation—

$$K_2C_2O_6 = K_2CO_3 + CO_2 + O.$$

When dissolved in water it is decomposed even at low temperatures into bicarbonate and oxygen—

$$2K_2C_2O_6 + 2H_2O = 2KHCO_3 + O_2.$$

This reaction is useful for the preparation of pure oxygen. On warming a solution of percarbonate a steady evolution of that gas occurs. When an aqueous solution of percarbonate is treated with H_2SO_4, H_2O_2 is formed, thus—

$$K_2C_2O_6 + H_2SO_4 = K_2SO_4 + 2CO_2 + H_2O_2.$$

Commerical potassium percarbonate invariably contains carbonate and bicarbonate. It may be purified by treating it with a solution of potassium hydrate, in which the percarbonate is insoluble, then washing with alcohol to remove the alkali. In this manner a product containing 90 per cent. of percarbonate may be obtained.

Primula Camphor. H. Brunner. (*Schweiz. Woch. für Chem. und Pharm.*, **42,** 305.) The so-called primula camphor is shown to be chiefly the methyl ester of metamethoxysalicylic acid, $C_6H_3.COOCH_3.OH.OCH_3$. 300 kilos of *Primula veris* roots, from about 20,000 primrose plants, gave 170 Gm. of crude liquid camphor; the rectified product had the sp. gr. 1·2155; b.p. 255°C. It is a colourless liquid when first distilled, but turns yellow on keeping.

Propane, Physical Properties of. P. Lebeau. (*Comptes rend.*, **140,** 1455.) Having prepared a considerable quantity of pure propane, the author finds that its physical properties differ materially from those given in works of reference. Its b.p. is found to be −44·5°C., and it remains fluid below −195°C., its critical temperature 97·5°, and its critical pressure 45 atmospheres.

Pyramidon, Detection of Antipyrine in, as an Adulterant. P. Bourcet. (*Bull. Soc. Chim.*, **33,** 572.) From 1 to 2 Cgm. of the sample is dissolved in 4 or 5 c.c. of cold water; 2 drops of H_2SO_4 66 per cent. are added, and 2 drops of a saturated solution of $NaNO_2$ or a few minute crystals of the salt. On shaking, pure pyramidon gives a bluish violet evanescent shade which in excess of $NaNO_2$ quickly disappears, leaving a colourless solution. If antipyrine be present, the violet colour of the pyramidon is succeeded by a persistent bluish green colour, the depth of which is directly according to the amount of antipyrine present. Since antipyrine is much cheaper than pyramidon, commercial samples of the latter are often adulterated therewith, sometimes to the extent of 33 per cent.

Quercitrin. D. H. Brauns. (*Archiv der Pharm.*, **242,** 561.) Although quercitrin has long been known, some little doubt exists as to the formula of the rhamnoside. Air dried quercitrin is found to have the formula $C_{21}H_{20}O_{11} + 2H_2O$. It loses 1 mol. H_2O at 100°C., and becomes anhydrous at 105°C.

Quinine and Cinchonidine, New Reactions for. C. Reichard. (*Pharm. Zeit.*, **50,** 314.) Advantage may be taken of the marked reducing action of quinine and cinchonidine for their identification. If a trace of $HgNO_3$ solution be allowed to evaporate on a porcelain surface, so as to form a small spot, and a crystal of the sulphate of either alkaloid be brought in contact therewith with a drop of water, a black colour is soon developed, which ultimately spreads over the whole spot. The reaction is much more rapid and sharp with cinchonidine than with quinine. The two alkaloids may be differentiated as follows. When a few crystals of quinine sulphate are intimately mixed with ammonium persulphate, and a few drops of H_2SO_4 are added to the mixture, an intense yellow colour is produced, which gradually fades. Cinchonidine does not give any reaction. If quinine be mixed with H_2SO_4 containing ammonium molybdate a light blue colour is formed, gradually becoming dark blue. With cinchonidine the dark blue tint is developed at once, without any preliminary light blue shade. If a few crystals of ammonium persulphate be added to these blue solutions, they effervesce and assume a deep yellow colour ; on adding formalin to this, followed by a few drops of AmCNS in concentrated solution, the cinchonidine gives a deep red brown colour, while quinine shows only a faint rose tint.

Quinine and Quinidine, Colour Reactions for. J. B. Battandier. (*Journ. Pharm. Chim.* [6], **20,** 151.) Upon a few c.c. of a moderately acid solution of quinine or quinidine, in a test tube, the vapour of bromine is allowed to fall and the whole well shaken up. The liquid loses its fluorescence and acquires a slight yellowish tint. One drop of solution of $CuSO_4$ is then added, then AmOH drop by drop, shaking after each addition. After the first drop of AmOH has been added the liquid assumes a peach-rose tint, increasing in depth with the second drop, then becoming violet and finally green. The addition of mineral acid to the green liquid turns it blue or violet, to which alkalies restore the green colour. If the acids be added to the peach coloured or violet solutions, these become green. These reactions are similar to those described by Hirschsohn in 1902, obtained with H_2O_2 and $CuSO_4$, but are obtained in the cold, and under quite different conditions.

Quinine, Determination of, in Cinchona Barks. —Vigneron (*Journ. Pharm. Chim.*, 21, 180.) The total alkaloids of 25 Gm. of bark are treated with 20 times their weight of pure ether and shaken well with 5 or 6 small pieces of pumice stone the size of a pea, previously moistened with alcohol 98 per cent. The small amount of alcohol thus introduced facilitates the separation of the quinine from the other alkaloids. The mixture is allowed to macerate for 6 hours at about 15°C., with occasional agitation, then filtered into a porcelain capsule, from which the ether is allowed to evaporate spontaneously. The residual alkaloids insoluble in ether are again macerated with a similar quantity of ether for 12 hours; the ethereal liquid is filtered into the same capsule and gently evaporated at about 15°C. To the residue 5 c.c. of alcohol and 100 Gm. of a saturated aqueous solution of quinine sulphate are added, followed by 10 drops of 1 per cent. aqueous hæmotoxylin solution. The capsule is then placed on the boiling water-bath to drive off the ether and alcohol. Meanwhile 2 or 3 c.c. of 10 per cent. sulphuric acid is added, then gradually a little 5 per cent. acid until the liquid assumes a lemon-yellow tint. If the faint acidity requisite be exceeded, a few drops of dilute ammonia are added until only a faint yellow colour is visible. The solution is then set aside in a cool place for 24 hours, and the crystals which have formed are collected on a tared filter, washed first with saturated quinine sulphate solution, then with a few c.c. of distilled water used in portions. The mixed sulphates of quinine and cinchonidine are then dried and weighed; 0·75 Gm. of these sulphates is then weighed off, dissolved by boiling in 85 c.c. of saturated solution of pure quinine chromate, and treated with 0·20 Gm. of pure K_2CrO_4 dissolved in a little water, allowed to cool, and the precipitated quinine chromate collected on a small tared filter, and washed with saturated solution of quinine chromate to bring the volume of the filtrate to 100 c.c. This filtrate may be tested for cinchonidine by the addition of NaOH solution. The crystals are then slowly washed with another 100 c.c. of saturated solution of quinine chromate, drained, dried at 100°C., and weighed as $(C_{20}H_{24}N_2O_2)_2CrO_4$. Since 0·746 Gm. of pure quinine sulphate gives under these conditions 0·764 Gm. of chromate, the equivalents may be taken as practically 75 and 76. If the first filtrate from the precipitated chromate gives no precipitate with NaOH, the amount of free chromate in the liquid may be determined volumetrically by means of KI and thiosulphate. In this case, a solution of 0·20 Gm. of K_2CrO_4 in 154 c.c. of water may be conveniently used as the precipitant; each c.c. of this will be equivalent to 0·005 Gm. of anhydrous quinine sulphate. At the same time the amount of hyposulphite used up by the iodine liberated by 100 c.c. of saturated solution of quinine chromate is noted; this number will be β. Operating on the above quantities, the first 100 c.c. of chromate filtrate collected will contain the equivalent of 4 c.c. of the titrated solution of K_2CrO_4. If this filtrate requires x c.c. of thiosulphate to titrate the iodine it liberates, the amount of quinine sulphate present in the mixed sulphates may be found from the formula $75 - \frac{x - \beta + 4}{2} =$ the number of Cgms. present in the 0·75 Gm. of sulphates taken.

Quinine Hydrochlorides. H. Caretto. (*Journ. Pharm. Chim.* [6], **20**, 347.) *Neutral Hydrochloride with 2½ mols.* H_2O. This was obtained by dissolving 1 molecular weight of quinia in 2 molecular equivalents of HCl in dilute aqueous solution, concentrating on the water-bath and cooling slowly. The crystals formed, when drained, responded to the formula $C_{20}H_{22}N_2O_2.2HCl.2\frac{1}{2}H_2O$. Although hygroscopic, they liquefy only in very damp air. In dry air and at 20°C. they lose a little of their crystal-water, at 102°C. the whole of it, becoming yellowish in colour while hot, but colourless on cooling. The hydrated salt has no definite melting point; it begins to melt at 80°, and remains half melted at 215°C.

Neutral Quinine hydrochloride with 1½ mols. C_2H_5OH. When neutral quinine hydrochloride is crystallized from alcoholic mother liquors, the crystals formed are more bulky than those obtained from aqueous solutions. The solutions in 95 or 100 per cent. alcohol often remain in supersaturation; on sowing these with a crystal of the salt, fine, well-formed crystals are obtained, having the formula $C_{20}H_{24}N_2O_2.2HCl.1\frac{1}{2}C_2H_5OH$. They keep well in sealed tubes. The same crystals may be obtained by rapidly evaporating, *in vacuo*, alcoholic solutions of the salt. They lose their alcohol of crystallization on warming, and almost all of it at normal temperatures, *in vacuo*. The same crystals are obtained from 55 per cent. alcohol. If the crystals be exposed to the light during drying they become yellow, and these yellow crystals are much more hygroscopic than those which have been dried in the dark, which are white. On exposing the salt with 1½ mols. $C_2H_5.OH$ to the air, it first loses its alcohol, then absorbs water from the atmosphere, and becomes converted into the salt containing 2½ mols. H_2O. Exposed in the dark to a temperature of 35–50°C. it loses all its alcohol and reabsorbs half a mol. H_2O, forming the salt $C_{20}H_{24}N_2O_22HCl\frac{1}{2}H_2O$, which is perfectly white and stable at that temperature, and is much less hygroscopic than the salt with 2½ mols. H_2O.

Anhydrous Neutral Quinine Hydrochloride. The anhydrous salt, whether obtained from the alcohol- or water-containing crystals, by drying at 102°C. is very hygroscopic, quickly absorbing water to form the salt with 2½ mols. H_2O. If the air be very damp, it takes up another ½ mol. H_2O, forming the salt $C_{20}H_{24}N_2O_2.2HCl. + 3H_2O$. The anhydrous hydrochloride has the $[\alpha]_D - 233°$.

Quinine Hydrochlorides. C. Erba. (*Journ. Pharm. Chim.* [6], **20**, 550.) The author controverts the statements of Carette that neutral quinine hydrochloride crystallized from alcohol 95 per cent. contains 1½ mols. alcohol. He has previously found, and now confirms, that the salt contains a molecule of both water and alcohol having the formula—

$$C_{22}H_{24}N_2O_2.2HCl. + C_2H_5OH + H_2O,$$

as shown by the amount of alcohol recoverable by distillation and by the products of combustion. The salt dried at 35–50°, which Carette considered had first lost its alcohol and then reabsorbed half a mol. H_2O, had therefore, in fact, merely lost half of its original water of crystallization and all its alcohol.

Quinine, Solubility of, in Ammonia, and Method of Testing Quinine Sulphate. W. Duncan. (*Pharm. Journ.* [4], **20**, 438.) Experiments show that quinine is not, as generally stated, more soluble in AmOH than in water, but less so. It is well known, however, that loss of quinine frequently follows when AmOH is used to precipitate it from its solutions, and the advice to avoid large excess of alkali is usually given, for excess increases the risk of supersaturation; but the chief cause of loss is not this, but hydrolysis of the ammonium salt when the precipitated alkaloid is being washed.

If quinine or its sulphate be added to an aqueous solution of AmCl, solution takes place. On adding AmOH to this solution quinine is precipitated, which redissolves on diluting the solution or on adding a little more AmCl. Similar results are obtained with Am_2SO_4, though not to the same extent. If solutions of KCl or NaCl be used, an increase in solubility of quinine sulphate is found. the more soluble quinine chloride being produced, but with quinine hydrate the increase is infinitesimal. Increase in solubility in solutions of ammonium salts must then be due to hydrolysis of the latter, the liberated acid again combining with the alkaloid when the washing is proceeded with. The greatest loss does not take place in the first washing, as it is usually strongly ammoniacal, but in the subsequent washings, as the free AmOH diminishes. AmOH is about the most unsatisfactory precipitant that can be used for any alkaloid if the alkaloid has to be collected and washed, and rarely gives theoretical yields. With the fixed alkalies there is not the same loss, hydrolytic dissociation being almost nil in their solutions.

The foregoing experience suggested that the AmOH test for the purity of sulphate of quinine might be made more reliable by replacing the AmOH with a more basic hydroxide. The test, which appears to be really a water test, is based on the differences existing between the solubilities of the sulphates of the alkaloids in water and the solubilities of the alkaloids in solution of AmOH. Kerner's test has been much criticized and often condemned, but the ease with which it can be applied is greatly in its favour, and accounts for its adoption, in one form or another, by most pharmacopœias. Using the Codex modification, it is not found to pass a sulphate that is over-contaminated, but the German modification may condemn a quinine sulphate that is practically pure. The success of the test is partly based on the assumption that cinchonidine is less soluble in AmOH than quinine. This may or may not be, but if aqueous solutions of quinine and cinchonidine sulphates of the same strength (1 in 1,000) be made, they behave somewhat differently to AmOH. On adding AmOH to the quinine solution precipitation at once takes place, the cloud disappearing on adding excess of the AmOH. On adding AmOH to the cinchonidine solution, no precipitation takes place at once as with the quinine. If this solution be allowed to stand for 30 minutes precipitation is apparent, or if the solution be vigorously stirred, a haziness becomes evident in from 2 to 5 minutes, and finally precipitation in the course of 2 hours. The success of the AmOH test, then, must lie more in the differences in quantities of the alkaloids present, from the differences in solubility of the sulphates, than from the differences in solubility of the alkaloids themselves in AmOH. Strength, temperature, method of mixing, all affect Kerner's test. Merely stirring the AmOH into the alkaloidal solution may cause a rise of from 2° to 5°C. The composition may also vary in the course of the experiment, for AmOH liquor is not a solution of NH_4OH; it is a solution of NH_3 and NH_4OH, the proportions of which vary with variations in temperature and pressure. All these are disturbing factors which should be eliminated by using a solution of a fixed hydroxide, and there would also probably be less likelihood of super-saturation.

Soda and potash were tried, and, though with success, B.P. lime water was finally chosen, for the following reasons: It is easily made of constant strength, is less liable to impurity, and any decomposition is evident to the eye.

The following were then carried out: To 10 c.c. of a saturated aqueous solution of purified quinine sulphate lime water was added till the precipitated quinine was dissolved and a water-clear solution obtained; 20 c.c. of lime water were required. The solution, on keeping, neither precipitated quinine nor calcium sulphate. Super-saturation was evidently absent.

To 10 c.c. of a similar cinchonidine solution lime water was added, and 120 c.c. were required, but the solution does not become clear like the quinine. There is an opalescence due to calcium sulphate which eventually precipitates. Solubility in lime water, however, has one of the faults of the ammonia test, a fault common to all eye determinations of solubility. The quantities required may vary from 1 to 5, or even 10 per cent., according as the solvent is added rapidly or slowly, stirred or shaken. To overcome this difficulty, determination of the sulphuric radicle suggested itself, making use of phenol-phthalein as an indicator (seeing it is neutral to alkaloids), and thus serving as a check on the solubility.

To 20 c.c. of the saturated aqueous solution of the purified quinine sulphate 3 drops of phenol-phthalein solution were added, and lime water run in from a burette till the permanent pink colour was obtained; 2 c.c. lime water were required. The test, repeated with 20 c.c. of a cinchonidine sulphate solution, took 13·7 c.c. We have thus a double method of testing the purity of quinine sulphate, the solubility of the alkaloids, and the quantity of sulphuric radicle in the aqueous solution.

To test the value of the methods, 5 Gm. of a commercial quinine sulphate were finely powdered and digested with 100 c.c. of water in a stoppered flask on a water-bath at 60°C. for 1 hour, the flask being frequently shaken. The solution was then allowed to cool to 15°C., and maintained at this temperature for 2 hours, frequently stirring, and finally filtered.

20 c.c. required 41 c.c. of lime water to form clear solution; 20 c.c. with phenol-phthalein required 2·8 c.c. of lime water to show alkalinity.

This sample was then mixed with a 1 per cent. (A), 3 per cent. (B), and 5 per cent. (C) of cinchonidine sulphate, and the three subjected to the tests. 20 c.c. of A required 45 c.c. of lime water to form a clear solution, 20 c.c. of A with phenol-phthalein required 3·3 c.c. of lime water to show alkalinity. 20 c.c. of B required 55 c.c. of lime water to form a clear solution. 20 c.c. of B with phenol-phthalein required 3·8 of lime water to show alkalinity. 20 c.c. of C required 71 c.c. of lime water to form a clear solution. 20 c.c. of C with phenol-phthalein required 4·7 c.c. of lime water to show alkalinity.

Saturation of the H_2SO_4 with calcium appears preferable to the solubility test, and might be made more delicate by using a weaker lime water. By using both, however, one checks the other, and a convenient, yet sufficiently exact, method of determining the purity of quinine sulphate is apparently obtained.

Quinine Sulphate, Testing of, for Cinchonidine. B. H. Paul (*Chem. and Drugg.*, **65**, 428.) After discussing the question of the solubility of quinine and cinchonidine in ether, and the influence of the presence of the latter on the solubility of the former in that solvent, the following method of applying the test is given:—

Dissolve 1 Gm. of the quinine sulphate to be examined in 100 c.c. of boiling distilled water. After cooling, filter the solution from the crystallized quinine salt and concentrate the filtrate to 30 c.c.; separate the further crystals that are thus formed by passing the cooled solution through a loose plug of cotton wool fitted in the neck of a funnel and make up the volume to 30 c.c., if necessary, by washing the crystals with a few drops of water. Shake up 5 c.c. of that solution with 1 c.c. of ether, in a corked tube, after adding 5 drops of ammonia solution, and leave the tube in a cool place for one hour. If at the end of that time no crystals are formed in the solution, the quantity of cinchonidine in the 5 c.c. of solution would be less than 0·004 Gm. and the corresponding quantity of sulphate in 1 Gm. of the salt under examination would not be more than

0·0324 (=0·004 × 1·35 Gm.) or 3·24 per cent.

In the more probable case of crystals being formed in appreciable quantity within a shorter time than one hour, the amount of cinchonidine sulphate in the salt under the examination will be more than 3·24 per cent. To ascertain how much more it may be, shake out a volume of the solution less than 5 c.c. with 1 c.c. of ether, repeating that operation until a difference, amounting to 0·5 c.c. of solution, between two experiments also corresponds to entire absence of crystals in the one instance and a very slight formation of crystals in the other, after 12 hours; then take the mean of those two quantities of solution as containing 0·004 Gm. of cinchonidine, and calculate the percentage of sulphate on that basis. Thus, for example, if 4 c.c. of solution gave no crystals and 4·5 c.c. only a very small quantity after 12 hours, 4·25 c.c. is to be taken as the quantity containing 0·004 Gm. of cinchonidine in the calculation, as follows:—

4·25 c.c. : 0·004 = 30 c.c. : 0·0282 × 1·35 = 0·038 in 1 Gm. or 3·8 per cent. of cinchonidine sulphate in the sample under examination.

The operations requisite in applying the ether-test are extremely simple, and, while they admit of being carried out with ease, the results obtainable are not deficient in accuracy.

Rancid Fats, Detection of, in Alimentary Substances. F. Wiedmann. (*Journ. Pharm. Chim.* [6], [20], 564, after *Zeits. unters. Nahr. und Germsmitt.*) It is known that the rancidity of fats has no relation to the free fatty acids which may be present in them, for an oil containing much free acid may be pleasant in flavour, and one which is rancid may show but little acidity. Rancidity is due to products of an aldehydic nature which may be thus detected. Five c.c. of the melted fat is mixed with 5 c.c. of a 1 per cent. solution of phloroglucin in acetone; 2 or 3 drops of H_2SO_4 are added. A red colour will be produced in the presence of 1 per cent. of rancid fat, and will vary in intensity as the rancidity is more marked. Other reagents, such as paraphenylenediamine, and guaiacum resin in presence of acetic anhydride, also give colour reactions. But no reaction is obtained with any of the above if the rancid fat has previously been heated above 200°C.

Raspberry, Essential Oil of. (*Haensel's Report*, through *Apoth. Zeit.*, 1904, **19**, 854.) Distillation of raspberry pressmarc affords a small quantity of a greenish essential oil with an intense odour of raspberries; sp. gr. at 15°, 0·8833; $[a]_D$ +2·8°; saponification value, 193; saponification value after acetylizing, 215; solubility in alcohol, 80 per cent., 1 : 30.

Red Colouring Matter of the Tomato. C. Montanari. (*Chem. Centralb.*, **76**, 544, after *Staz. sperim. Agar. Ital.*, **37**, **909**.) The red colouring matter of the tomato, considered by Arnaud to be carotin, $C_{26}H_{38}$, is found by the author to be dicarotin, $C_{52}H_{74}$. It crystallizes from benzol as deep red crystalline mass of needles and lamellæ; m.p. 170°. It forms a green amorphous iodo-additive compound, $C_{52}H_{74}I_2$.

Rhamnus frangula Bark, Determination of Active Principles in. J. Warin. (*Journ. Pharm. Chim.* [6], **21**, 253.) The following colorimetric method is based on the fact that the green tint of a solution of nickel chloride will neutralize the rose colour of dilute alkaline emodin solution. The standard solution of nickel is prepared by dissolving on the water-bath 1 Gm. of the metal in 5 c.c. of a mixture of HNO_3 1 part, and HCl 3 parts. If necessary, add a little more acid and a little water to dissolve the salt formed. When the metal has completely dissolved dilute to 100 c.c. with distilled water. This solution will exactly neutralize the rose tint of 1 Mgm. of emodin dissolved in 100 c.c. of faintly alkaline water. The nickel solution should be standardized against a solution of pure emodin of the above strength in the following manner: Two twin tubes of about 40 c.c. capacity, one of which is graduated in 0·1 c.c., are taken and are covered with black paper, in which two longitudinal slits are cut which are directly opposite each other, on either side of the tubes, so that the tint of the liquid may be readily observed through them, when the tubes are placed on a white surface. When one tube filled with the nickel solution and the other with the emodin solution are placed one in front of the other and the light is observed through the coinciding slits, if the nickel solution is of the correct strength it will be absolutely colourless. It sometimes happens that from impurity in the metal it is slightly weak. Its strength should then be adjusted. Having thus obtained a standard colour solution, the determination of the emodin in *Rhamnus frangula* bark is thus performed :—

Half a Gm. of the powdered bark is macerated for 24 hours with 50 c.c. of a 0·5 per cent. solution of NaOH, with occasional vigorous shaking. Filter, pipette off exactly 10 c.c. of the filtrate, and dilute it to 100 c.c. Fill the ungraduated tube with the nickel solution, and place 10 c.c. of the above diluted buckthorn solution in the graduated one. Place the tubes in front of each other; as the bark generally contains more than 1 per cent. of emodin the rose colour will predominate. Then cautiously dilute the buckthorn solution with distilled water, thoroughly mixing, until this rose tint disappears and a perfectly colourless light is obtained. On now reading off the number of c.c. of liquid in the rose-coloured tube, the weight in Gm. of emodin in 1 kilo of the drug will be obtained. If on the first reading the green tint should predominate, the drug will contain less than 1 per cent. of emodin; in that case another alkaline maceration must be made, using a larger quantity of the original substance. Sometimes the rose tint obtained is accompanied by a slight yellow shade; but this does not interfere with the result; the final reading is then made with a faint yellow tint instead of a colourless light; this is easily done, for on exceeding the limit, the green shade of the nickel solution is very sharply evident.

Rhubarb and Aloes, Assay of. A. Tschirch and — Christofoletti. (*Pharm. Post,* **37,** 233, 249, 265.) *Determination of Emodin in Rhubarb.* The method is colorimetric, the standard colour being that given by 0·001 Gm. of pure aloe-emodin dissolved in 1 litre of distilled water rendered slightly alkaline with KOH. This has a pale rose colour. 0·5 Gm. of the rhubarb, in very fine powder, is boiled for 15 minutes, under a reflux condenser, with 50 c.c. of H_2SO_4 50 per cent.; the anthra-glucosides are thus hydrolized and anthraquinone derivatives set free. When cold, the liquid, without filtration, is shaken out with successive 50 c.c. of ether until that solvent is no longer coloured and does not give a rose colour when a portion is tested with KOH. The separated aqueous liquid is again boiled for 15 minutes, cooled, and again shaken out with ether. The bulked ether extracts are then shaken out with successive washings of 5 per cent. KOH solution until a rose tint is no longer obtained. The bulked alkaline liquid is then made up to 500 c.c. 100 c.c. of this solution is diluted to 1 litre; the colour is then matched against that of the standard emodin solution, on a white surface, in the usual manner. The tint of the rhubarb solution will generally be too dark; it must therefore be diluted with a known volume of water. A good rhubarb should give from 2·8 to 4 per cent. of emodin; *Rheum rhaponticum* only yields about 1·2 per cent.

Valuation of Aloes. Since the active principals, chiefly aloins, are soluble in $CHCl_3$, while the inert resins are insoluble, the determination of the $CHCl_3$ soluble constituents suffices for the assay. 5 Gm. of aloes are macerated for 12 hours with 5 c.c. of methyl alcohol, then warmed to 50–60°C. and treated with 30 c.c. of $CHCl_3$. After thorough agitation the mixture is set aside and the chloroform separated and filtered into a tared flask. The insoluble residue is again treated with another portion of $CHCl_3$, the solution added to that first obtained, the solvent distilled off, and the residue, dried at 100°C., weighed. Cape and Uganda aloes yield 80 to 85 per cent. of $CHCl_3$ extract, Socotrine aloes but 36·6 per cent. The aloin in the chloroform residue may, if desired, be determined colorimetrically by Schouten's reaction, the production of a yellow colour and strong green fluorescence with a saturated solution of borax. A standard solution of 0·004 Mgm. of aloin in borax solution is prepared; this shows a just visible green fluorescence when observed through a depth of 12 mm. in a vessel placed on black paper. A known weight of the above $CHCl_3$ residue is treated with a saturated aqueous solution of borax, and diluted until its degree of fluorescence is identical with that of the standard. A simple calculation then gives the amount of aloin present.

Uganda aloes gives about 16 per cent. The remaining 64 per cent. of $CHCl_3$ extract consists mainly of anthraquinones.

Robinin. N. A. Valiaschko. (*Journ. Soc. Phys. Chim.*, through *Bull. Soc. Chim.*, **34,** 348.) Robinin has been considered to be a glucoside closely related to rutin and quercitrin, and to give quercetin on hydrolysis. The author states that this resemblance is only apparent, and that quercetin is not one of its products. The glucoside is obtained as a yellowish, odourless crystalline powder by extracting the fresh flowers of *Robinia pseudo-acacia* with water and concentrating the aqueous solution. The glucoside crystallizes out on cooling and is purified by recrystallization. It has the formula $C_{33}H_{40}O_{19}7\frac{1}{2}H_2O$; dried *in vacuo* or at 100° it retains 5 mols. H_2O; it is only obtained anhydrous after exposure to 110°C. It commences to melt, when dried, at 188°C., but is not completely melted below 195°. It is sparingly soluble in cold water (1 : 3000), and the solution is nearly colourless. Hot saturated solutions are yellow in colour. It is hydrolized by boiling with dilute acids and by ferments forming robigenin, $C_{15}H_{10}O_6$, 2 mols. of rhamnose and 1 mol. galactose according to the equation—

$$C_{33}H_{40}O_{19}+3H_2O=C_{15}H_{10}O_6+2C_6H_{12}O_5+C_6H_{12}O_6.$$

Robigenin, recrystallized from alcohol, forms small odourless and tasteless yellow crystals, brighter in colour than quercetin; m.p. 270°C. The sugar of robinin may be identical with rhamnose, which also splits up into 2 mols. of rhamnose and 1 mol. of galactose.

Rose, Essential Oil of, Bulgarian, Characters of. (*Schimmel's Report, Oct.*, **1904,** 81.) The following characters are based on observations extending over a number of years. Sp. gr. $\frac{30}{15^\circ}$ 0·849 to 0·862, rarely up to 0·863; $[\alpha]_D$ −1° 30′ to −3°; $[\eta]_D$ 1,452 to 1,464; congealing point, +19 to +23·5°; acid number, 0·5 to 3; ester number, 8 to 16; total geraniol (geraniol plus citronellol), 66 to 74 per cent., rarely 76 per cent.; citronellol, 26 to 37 per cent., generally 30 to 33 per cent. Citronellol is determined by formylating; 1 volume of the oil is heated with 2 volumes of absolute formic acid for an hour under a reflux condenser; the determination is then conducted as in acetylating.

Rose, Essential Oil of, French and Bulgarian. P. Jeancard and C. Satie. (*Bull. Soc. Chim.* [3], **31,** 934). *Non-petaloid portions of French roses* grown in the Cannes district, composed of the calices, stamens, etc., when distilled gave 50 Gm. per 1,000 kilo. of a green essential oil having the following characters: Congealing point, 8°C.; stearoptene, 51·13 per cent.; sp. gr. at 15°C., 0·8704; $[a]_D$ −41; acid value, 6·12; saponification value, 22·4; total alcohols, 13·99 per cent.; citronellol, 13·55 per cent. The stearoptene consisted mainly of a body congealing at 14°C. Practically all the alcohol present was citronellol, which accounts for the high lævo-rotation of the oil.

French Otto of Rose, obtained by cohobation and distillation, had the following characters: Congealing point, 25·5°C.; stearoptene, 33·2 per cent. After removing this stearoptene the residual oil had the sp. gr. 0·8790 at 15°C.; $[a]_D$ −3°; solubility in alcohol, 70 per cent. 1 : 2; total alcohols, 88·55 per cent.; citronellol, 22·4 per cent. When distillation was performed *without cohobation,* and the distillate was collected weight for weight with the roses employed (as is done in making rose water) the yield of oil was very small. This otto had the congealing point 25·9°C.; stearoptene, 58·88 per cent.; acid value, 2·24 per cent.; saponification value, 14·7 per cent.; total alcohols, 32 per cent.; citronellol, 15·10 per cent. (See also *Year-Book,* **1897,** 190.)

Otto of Tea Rose was found to contain 72 to 74 per cent. of stearoptene; congealing point, 23·5°C. This stearoptene, like that of the oil from the green floral envelopes, consisted mainly of the body melting at 14°C., and another melting at 40°C. These facts demonstrate the fallacy of basing any opinion on the value of an otto by its congealing point. The amount of stearoptene should be determined gravimetrically, and that of the citronellol in the stearoptene-free residue. 10 Gm. of otto is treated with 50 c.c. of acetone and frozen to −10°C. without stirring; the separated stearoptene is then collected on a tared filter in a funnel surrounded by freezing mixture, washed with chilled acetone, drained, dried *in vacuo* over sulphuric acid and weighed. The acetone is then distilled off the filtrate *in vacuo,* and the residue employed for the determination of the citronellol.

Bulgarian Otto of good quality is found to have the following characters: Congealing point, 19° to 21°C.; stearoptene, 18 to 23 per cent.; the stearoptene free oil has the sp. gr. 0·886 to 0·888 at 15°C.; $[a]_D$ −1° to −3°; solubility in alcohol, 70 per cent., 1 : 1·5 ; acid value, 1 to 2 ; saponification value, 10 to 12 ; total alcohol, 84 to 88 per cent. ; citronellol, 30 to 40 per cent.

Standards. French otto of rose should contain from 30 to 35 per cent. of stearoptene ; the stearoptene-free oil should yield 20 to 23 per cent. of citronellol ; the same from Bulgarian otto should contain 30 to 40 per cent. of citronellol ; while the percentage of stearoptene should be from 18 to 23.

Rose, Essential Oil of, Iodine Absorption Value of. W. H. Simmons. (*Chem. and Drugg.*, **65,** 703.) The value of the iodine absorption figure for otto of rose (*Year-Book*, **1904,** 158) has been confirmed by extended observation. The following are some of the results obtained, from which it will be seen that those oils which from their other constants and odour appear to be genuine have iodine-absorptions well within the limits 187–194 previously given, while those which from analysis and odour may be classed as suspicious or adulterated have iodine-numbers ranging from 199 to 210 :—

No		Sp gr $\frac{30}{15^\circ}$ C	Rotation, 100 mm tube at 30 C	Refractive Index, η_D at 20°C	Saponification Number	Setting-point	Iodine Number
Genuine	1	0·8560	–2° 25′	1·4613	9·6	20·4°C.	191
	2	0·8516	–1° 50′	1·4636	8·3	21·6°C.	192
	3	0·8547	–3° 0′	1·4646	7·7	19·9°C.	191
	4	0·8535	–2° 40′	1·4626	9·9	20·7°C.	191
	5	0·8542	–3° 10′	1·4627	8·0	20·3°C.	189
Suspicious or Adulterated	6	0·8600	–1° 53′	1·4640	9·9	20·0°C.	200
	7	0·8565	–2° 0′	1·4628	13·0	19·8°C.	204
	8	0·8607	–2° 16′	1·4654	16·2	19·4°C.	210
	9	0·8559	–2° 20′	1·4636	8·7	20·9°C.	199
	10	0·8554	–1° 34′	1·4647	11·0	21·6°C.	209

A noteworthy point in the above table is the wide variations in the refractive index, a figure which has been much recommended of late by Parry and others in the examination of otto samples. To test the value of this constant, it has been determined for some 36 samples, 23 of which there is every reason to believe are genuine, the other 13 being of doubtful quality. The satisfactory samples gave an average refractive index of 1·4626, a maximum of 1·4654, and a minimum of 1·4592, while the others varied from 1·4615 to 1·4770. The following table shows the results for those samples of which the iodine-absorption is also known, together with the other analytical data (Nos. 1 to 7 are genuine, the others are suspicious or adulterated) :—

No.	Sp gr	α_D	η_D	Saponification Number.	Setting-point.	Iodine Number
1 . . .	0·8504	− 2° 28′	1·4598	8·7	21·3°C.	188
2 . . .	0·8531	− 2° 40′	1·4629	7·5	20·4°C.	187
3 . . .	0·8541	− 2° 7′	1·4640	8·1	20·8°C.	192
4 . . .	0·8526	− 2° 0′	1·4618	7·7	20·5°C.	192
5 . . .	0·8512	− 2° 35′	1·4634	8·3	21·0°C.	191
6 . . .	0·8534	− 2° 45′	1·4647	11·7	20 6°C.	193
7 . . .	—	− 2° 40′	1·4654	7·4	20·8°C.	190
8 . . .	0·8570	− 2° 30′	1·4638	8·0	19·9°C.	208
9 . . .	0·8561	− 2° 47′	1·4658	8·4	19·2°C.	212
10 . . .	0·8581	− 1° 24′	1·4664	10·3	21·3°C.	234
11 . . .	0·8797	−19° 50′	1·4690	40·8	28·4°C.	142
12 . . .	0·8554	− 2° 42′	1·4652	8·1	19·8°C.	206
13 . . .	0·8550	− 2° 2′	1·4655	9·8	20·6°C.	215
14 . . .	0·8551	− 1° 30′	1·4612	11·2	19·8°C.	205

The last two samples in the above table were purposely adulterated in the laboratory, No. 13 containing 25 per cent. of a standard brand of artificial otto, while to No. 14 had been added 15 per cent. of palmarosa oil. These results show that the generally accepted limits, 1·4600 to 1·4650 or even 1·4670, are too wide for the figure to have much value, as they cover many adulterated samples, and in cases where the refractive index is beyond the limit, such as No. 11,. the other figures would also be abnormal. On the other hand, the iodine-absorption readily reveals such adulteration as exists in the last two samples, and is, indeed, the only figure which does so.

Rosemary Oil. (*Schimmel's Report, Oct.*, **1904,** 82.) *English Rosemary Oil.* An authentic specimen of the oil distilled by Sawer at Brighton had the sp. gr. 0·9042 at 15° ; [$]_D - 2°$ 49′ ; $[\alpha]_D$ of first 10 per cent. −6° 10′ ; ester value, 9·7 ; solubility in alcohol 80 per cent., 1 : 5 and more with slight turbidity.

Spanish Rosemary Oil. Two kinds of rosemary oil are distilled in Spain ; the ordinary, which agrees in characters with the French and Dalmatian distillate, and what is known as rosemary oil "courant," which is distilled from a mixture of rosemary and sage. This "courant" oil is distinguished by its high ester value up to 37, whereas the figure for normal oil does not exceed 12. A specimen of "courant" rosemary oil recently examined had the sp. gr. 0·9258 ; $[\alpha]_D + 14°$ 35′ ; $[\alpha]_D$ of first 10 per cent. +0° 40′ ; acid number, 0·9 ; ester number, 35·7 ; solubility in alcohol 80 per cent., 1 : 1 and more.

Roucheria griffithiana Bark, Lupeol from. J. Sack and B. Tollens. (*Berichte,* **37,** 1904.) Roucheria bark, which is used by the natives of Malacca as a constituent of arrow poison, has been investigated by the authors who have isolated from it, in addition to glucose, a crystalline body belonging to the cholesterin group, which is possibly identical with the lupeol of Schulze and Likiernik (*Year-Book*, **1891**, 61) and that found by Romburgh (*Berichte*, **37**, 3,440), occurring in the form of a cinnamic acid ester in guttapercha. The alcoholic extract of the bark after evaporation *in vacuo* left a sticky residue which soon solidified. After repeated crystallization from dilute alcohol it was obtained in the form of slender colourless needles, m.p. 213°C. It is insoluble in water, in dilute acids and alkalies, and is readily soluble in most organic solvents, but less so in glacial acetic acid, ligroin, and acetone; $[a]_D + 27{\cdot}04$. Treated with acetic acid and a couple of drops of concentrated sulphuric acid it develops a violet colour on standing. It gives a benzoyl derivative, which crystallizes from ether in prisms melting at 262° ; Schulze and Likiernik (*Zeitschr. Physiol. Chem.*, **41**, 475) give 265–266° as the m.p. Unlike the lupeol described by these authors, however, the body under notice gives a dibromide instead of a monobromide and no acetyl derivative.

Saccharin, Detection of, in Beverages. — Villiers, Maynier de la Source, Rocques and Fayolle. (*Annales de Chim. Analyt.*, **9**, 418.) The liquid, deprived of any alcohol by evaporation, is precipitated with neutral lead acetate in the presence of a slight amount of free acid, obtained, if necesary, by adding 1 per cent. of acetic acid. Excess of lead is removed by means of sodium phosphate and the precipitate filtered out. The filtrate is extracted by shaking out three times with half its volume of pure benzol. A greater part of the benzol is then distilled off, and the residue is shaken with a 1 : 1000 solution of Fe_2Cl_6 to determine the presence or absence of free salicylic acid. The rest of the benzol is then distilled off, without removing the Fe_2Cl_6 solution. The aqueous residue is treated with 10 c.c. of 10 per cent. H_2SO_4 solution warmed on the water-bath, when solution of $KMnO_4$ is gradually run in until its colour s no longer discharged. The liquid thus obtained is again extracted three times with half its volume of benzol. The bulked benzol extracts are distilled to dryness, the residue is taken up with 2 c.c. of warm water, and a drop of this solution taken, to determine if it has the sweet taste of saccharin. If this be present, the rest of the liquid is treated with 2 c.c. of NaOH solution, sp. gr. 1·334, and evaporated to dryness in a test-tube. This is then attached to a thermometer, plunged into a fusible metal bath at 270°C., kept at that temperature for 3 minutes. The residue is then dissolved in 10 per cent. H_2SO_4, the solution again shaken out with benzol, and the benzol solution tested for the presence of salicylic acid by shaking with 10 per cent. Fe_2Cl_6 solution. Any violet colour reaction then obtained indicates the presence of saccharin. (See also *Year-Book*, **1904**, 159.)

Saccharose in Officinal Roots, Rhizomes and Bulbs. M. Harlay. (*Journ. Pharm. Chim.* [6], **21,** 49.) Saccharose may be considered to be universally distributed in the subterranean organs of plants, as shown by the following table :—

Species.	Organ and time of Gathering.	Reducing sugar per cent	Saccharose per cent.
Nuphar luteum	Rhizome. April . . .	0·19	0·08
Cochlearia armoracia . .	Root. May	0	1·18
Astragalus glycyphyllos L. .	Root bark. May . . .	0·40	0·72
,, ,, .	Root, central portion . .	0·34	0·68
Petroselinum sativum Hoffm.	Root. October . . .	0	0·60
Conium maculatum L. . .	Root. July	0·23	1·20
Levisticum officinale Koch .	Root bark. October . .	0·15	2·45
,, ,, .	Root, central portion . .	0	2·71
Fœniculum dulce D. C. . .	Root bark. October . .	0	1·49
,, ,, . .	Root, central portion . .	0	2·37
Eryngium campestre L. . .	Root. August . . .	0	4·95
,, ,, . .	Root. October . . .	0	3·65
Valeriana officinalis L. . .	First year's root. October	0·77	0·69
,, ,, . .	Second year's root. July	0·68	0·30
,, ,, . .	,, ,, ,, October	0·46	0·05
Symphytum officinale L. .	Root bark. May . .	0·72	1·50
,, ,, .	Root, central portion . .	0·85	1·42
Cynoglossum officinale L. .	Root bark. April . .	1·62	0·54
,, ,, . .	Root, central portion . .	1·42	1·01
Solanum Dulcamara L. . .	Root. March . . .	0	0·96
Hyoscyamus niger L. . .	Root bark. May . .	0·18	0·35
,, ,, . .	Root, central portion. .	0	0·61
Verbascum thapsus L. . .	Root bark. April . . .	0·21	0·69
,, ,, . .	Root, central portion . .	0·24	0·73
,, ,, . .	Root bark. December .	0·85	0·32
,, ,, . .	Root, central portion .	0·24	0·21
Digitalis purpurea L. . .	Root. January . . .	0·85	1·22
Digitalis lutea L . . .	Root. October . . .	0	0·64
Scilla maritima L. . . .	Bulb	2·54	0·27
Orchis purpurea Huds. . .	Tubercule. May . . .	0·50	0·40
Arum maculatum, L. . .	Young tubers. March .	0	0·36
,, ,, . .	Young tubers. July . .	0·44	0·81
,, ,, . .	Old tubers. March . .	1·08	0·64
Agropyrum repens P. B. .	Rhizome. March . .	0·63	0·99
Saponaria officinalis . . .	Root bark. May . .	0	0·64
Spirea ulmaria	Central column. May .	0·23	0·3
Echium vulgare	Central column. February	0·21	6·75
Ruscus aculeatus	Root. November . .	0·52	0·24

All these were examined in the fresh state, except squill.

Sambucus niger Berries, Presence of Tyrosine in. J. Sack and B. Tollens. (*Berichte*, **37,** 4115.) Tyrosine has been isolated from fresh elderberries by extracting them with boiling water, precipitating with lead acetate, removing the lead precipitate, eliminating excess of lead acetate with SH_2, evaporating and crystallizing.

Sandal Oil, East Indian, in Capsules, Adulterated with Castor Oil and West Indian Sandal Oil. (*Schimmel's Report, May,* **1905,** 73.) Two sophisticated samples of East Indian sandal wood oil from capsules are reported on. In one of these the adulterant was castor oil; in the other, an admixture of West Indian sandal oil and castor oil was present.

Sandarach Wood, Essential Oil of. E. Grimal. (*Comptes rend.*, **139,** 927.) Sandarach sawdust, from the wood of *Thuja articulata* (*Callitris quadrivalis*), yields, on distillation with steam, 2 per cent. of a dark reddish-brown lævorotatory essential oil with a phenolic odour; sp. gr. 0·991; soluble in all proportions in alcohol 80 per cent. It contains about 5 per cent. of phenols removable by alkali, consisting of carvacrol and thymohydroquinone. Thymoquinone is present in the alkali-insoluble non-phenol portion.

Saponarin. G. Barger. (*Chem. News*, **90,** 183.) Saponarin, the glucoside, $C_{21}H_{24}O_{12}$, from *Saponaria officinalis*, crystallizes from aqueous pyridine in small needles, m.p. 231°C. with decomposition. It is insoluble in water and organic solvents, but dissolves in weak alkalies and in pyridine. The alkaline solutions are yellow; when these are acidified the saponarin remains in pseudo-solution in which condition it gives an intense blue coloration with solution of I in KI. It is very hygroscopic, and is hydrolized by diluted acids, forming glucose and saponaretin.

Savin, Essential Oil of. E. F. Ziegelmann. (*Pharm. Review*, through *Journ. Pharm. Chim.* [6], **21,** 280.) The U.S.P. states that savin oil is derived from the ends of the shoots of *Juniperus sabina*. In Belgium the fresh leaves are distilled, in Greece the fresh twigs; in Spain the leaves and fruits, while the "Arzneimittel" and the Portuguese Pharmacopœia describe it as the product of distilling the whole plant. The yield of oil is stated to be from 4 to 5 per cent. The author, distilling the whole plant, only obtained 0·0154 per cent., separating on distillation, and another 0·038 per cent. recovered from the aqueous distillate by shaking out with petroleum ether; a total yield of 0·0568 per cent. The oil separating spontaneously from the distillation water was amber coloured, and had a pleasant terebinthinous odour; sp. gr. at 25°C. 0·91329; that recovered by shaking out was darker in colour and had the sp. gr. 0·9133 at 25°C. The oil was optically inactive; it is generally described as being dextrorotatory + 42 to 60°. It was soluble 1 : 1 in absolute alcohol; 1 : 16 in 80 per cent. alcohol; but insoluble 1 : 20 in 70 per cent. alcohol; acid value, 7·33 to 7·53; ester value, 109·1 to 111·9, the latter corresponding to 37·8 or 38·95 per cent. of sabinyl acetate. The oil recovered by petroleum ether is amber coloured when rectified, and has a pleasant odour. Its sp. gr. is then 0·9146 at 25°, and it also is devoid of optical activity.

Skimmianine, a Poisonous Alkaloid from Skimmia japonica. J. Honda. (*Apoth. Zeit.*, **19**, 881, after *Archiv. für exper. Path.*) *Skimmia japonica*, which is widely spread in Japan in the wild state, as well as being cultivated for the beauty of its flowers and fruits, is found to contain, in all its parts, a poisonous alkaloid, skimmianine, $C_{32}H_{29}N_3O_9$, which crystallizes from alcohol in fine prismatic crystals, m.p. 175·5°C. It occurs in the greatest quantity in the leaves, from which it is extracted by means of alcohol, purified by shaking out with chloroform in the usual manner, and finally recrystallized from alcohol. It is a feeble base, and does not reduce alkaline cupric solutions either before or after treatment with acids. In frogs it causes muscular rigidity and increases reflex excitability.

Soap, Detection of Sodium Silicate in. Ahmed-Hussein. (*Journ. Pharm. Chim.*, **21**, 496.) A known weight of rasped soap is dissolved in hot alcohol and filtered through a tared filter, the insoluble matter being well washed on the filter, dried, and weighed. A portion of this residue is then treated in a test-tube with a few c.c. of distilled water and gently warmed. If the liquid then shows an alkaline reaction, silicate is probably present. A little NaOH is then added, the mixture warmed, filtered, rendered acid with HCl, and the silica precipitated with AmOH. The author finds that the statement generally made in text books, that the silica precipitate may be obtained by treating the insoluble residue with water and HCl, is incorrect, since the dried silicate becomes, by the treatment it has undergone, almost insoluble in water alone, and requires the addition of alkali to dissolve it.

Sodium Alum. J. M. Wadmore. (*Proc. Chem. Soc.*, **21,** 150.) The existence of sodium alum, first affirmed by Zellner in 1816, and by Augé in 1890, has been denied by Ostwald. The author has succeeded in preparing it by mixing solutions of the respective molecular weights of Na_2SO_4 and Al_23SO_4. It crystallizes in octahedra, having the formula $Na_2SO_4,Al_23SO_424H_2O$. It is very soluble in water 1·0711 : 1 at 10·6°C. A hot concentrated solution deposits on cooling, a pasty or oily substance, which is slowly transformed into crystalline sodium alum. This paste may be a mixture of anhydrous, or partly hydrated alum, and water. Sodium alum does not effloresce appreciably under ordinary conditions, but rapidly loses about half its crystal-water at 50° ; a higher temperature is requisite to obtain the anhydrous salt.

Sodium Salts, Detection of, by Modified Fremy's Reagent. J. Bougault. (*Journ. Pharm. Chim.* [6], **21,** 437.) The preparation of the potassium pyroantimonate reagent of Fremy is tedious, and the commercial salt is far from pure. The author therefore modifies the original method as follows. Antimonous chloride, 1 Gm., is added to a mixture of solution of pure K_2CO_3 10 c.c. and H_2O_2 solution, 10 volumes, 45 c.c., and gently warmed. The precipitate at first formed slowly redissolves, and an abundant evolution of oxygen occurs. Solution is complete in 5 to 10 minutes, but a slight insoluble deposit remains, which is filtered out after cooling. In employing this reagent to detect sodium salts the following precautions are necessary. (1) Only to use a very small quantity of the reagent; 0·5 c.c. is always enough, since the precipitate formed is not soluble in excess of sodium salt. (2) The sodium solution should be reduced to the smallest possible volume ; it should be either alkaline or neutral : acids precipitate the reagent. (3) After adding the reagent the mixture should be boiled for half a minute. (4) When the boiled liquid has cooled, the sides of the tube should be scratched in one or two places beneath the liquid with a glass rod, carrying at the end a trace of sodium pyroantimonate, to start crystallization.

Under these conditions the reagent will give an immediate and evident precipitate with 0·0004 Gm. of NaCl.

Detection of Na in presence of K. When much K is present the greater excess must be eliminated as $KHC_4H_4O_6$; after filtration the Na must be converted into Na_2CO_3 or Na_2SO_3. In the case of sulphates the mixture is precipitated by $Ba2C_2H_3O_2$ and filtered, the filtrate is evaporated, calcined, the residue redissolved, filtered, treated with $H_2C_4H_4O_6$; the $KHC_4H_4O_6$ filtered out, the filtrate again evaporated and calcined, the residue taken up with 1 c.c. of water and tested with the reagent. With chlorides, iodides and bromides, the solution is precipitated with $AgNO_3$. Nitrates are merely calcined and treated with $H_2C_4H_4O_6$. In this manner 0·0063 Na_2CO_3 is readily detected in 4 Gm. of K_2CO_3 ; 0·004 Gm. of NaBr in 2 Gm. of KBr ; 0·005 Gm. of Na_2SO_4 in 2 Gm. of K_2SO_4.

Lithium salts themselves give a precipitate with the pyroantimoniate reagent, but this is much more soluble than the sodium salt. It differs also in crystalline form, as shown by microscopical examination of the precipitate. Lithium pyroantimoniate forms hexagonal scales, like iodoform, while the sodium salt, when slowly formed, is in almost cubical prisms, when quickly crystallized in fascicles of needles or small long prisms quite distinct from the lithium crystals. The reagent is fairly stable.

Sophora japonica, Sophorin from. D. H. Brauns. (*Archiv der Pharm.*, **242**, 547.) The dried flower heads of the Chinese plant *Sophora japonica* yield to extraction with hot water a crystalline rhamnoside, sophorin, $C_{27}H_{30}O_{16}$. When dried in the air it retains 3 mols. H_2O of crystallization, and 2 mols. when dried in a desiccator or in the water-oven, but becomes anhydrous at 110°C., or if dried *in vacuo*. When hydrolized with dilute H_2SO_4 it is split up into rhamnose, glucose, and sophoretin, $C_{15}H_{10}O_7$; this crystallizes with 2 mols. H_2O, which are drawn off in the water-oven, and by prolonged exposure in the vacuum drier.

Spear Poison from the Cameroons. L. Brieger and M. Krause. (*Zeits. für exp. path.*, through *Chem. Centralblat*, **76**, 1171.) The spearhead poison used by the natives of the Cameroons on their weapons for elephant hunting, and obtained from the powdered wood of a species of *Strophanthus* known as

Obó or Nschom, yields 8 per cent. of crystalline strophanthin. This strophanthin, crystallized from alcohol, and air-dried, has the m.p. 93°C.; after drying at 103 it melts at 186–187°C. Its ultimate analysis gives figures similar to the strophanthin of *Strophanthus hispidus, S. kombé, S. gratus,* and other plants, which it also resembles in physiological action.

Storax, Tests for. C. Ahrens and P. Hett. (*Pharm. Centralh.*, **45,** 571.) Pure storax is almost insoluble in cold petroleum ether, while the resinous matter used as an adulterant is readily soluble. The storax is rubbed down with sand and petroleum ether; the solvent, when evaporated, leaves, with a pure sample, a thick fluid residue, having the acid value 40 to 55, and the saponification value 180 to 197. If resin be present, this residue is resinous, and has a turpentine odour. Its acid value is 116 to 121, and the saponification value 172 to 178. (See also *Year-Books*, **1901,** 116; **1903,** 253)

Sugar, Microchemical Detection of. E. Senft. (*Journ. Pharm. Chim.* [6], **21,** 320.) A glycerin solution of phenylhydrazine acetate is prepared by mixing 10 per cent. glycerin solutions of sodium acetate and phenylhydrazine hydrochloride. The solution suspected to contain sugar is heated with this reagent for 30 minutes on the water-bath. If the osazone does not separate in distinct crystals, it is dissolved in alcohol and evaporated. Distinctive crystals of the various sugars will be thus obtained.

Sugar, New, in Mountain Ash Berries. G. Bertrand. (*Comptes rend.*, **139,** 802.) Besides sorbite, the berries of the mountain ash contain another sugar, a hexose, $C_6H_{14}O_6$, which has been named sorbierite, which is isomeric with mannite and sorbite. It is isolated from the mother liquors of sorbite, which are diluted, fermented first with yeast, then, after sterilization, with the specific sorbose ferment, which converts much of the remaining sorbose into sorbite. After purification with lead subacetate, the remaining sorbite is crystallized out in the presence of a little alcohol; the new sugar is removed from the mother liquor by treatment with benzoic and sulphuric acid. The sugar liberated from the acetal thus obtained is pure sorbierite. It crystallizes in very soluble clinorrhombic prisms; m.p. 75°C. $[a]^{20}_{D}$ −3° 35′.

Sugar of Cocos nucifera and of Borassus flabelliformis. E. Bourquelot. (*Journ. Pharm. Chim.* [6], **20,** 193.) These Indian sugars are met with in the form of lenticular cakes of small agglomerated crystals. That from *Cocos nucifera* is obtained from the milk of the nut, and has the following percentage composition: reducing sugar, 1·99; saccharose, 74·95; moisture, 8·03; ash, 4·73. When hydrolized it gives 76·49 per cent. of reducing sugars. The sugar of *Borassus flabelliformis*, the palm from which the fermented "palm wine" is obtained, is prepared from the sap; its percentage composition is: reducing sugars, 2·4; saccharose, 79·12; moisture, 9·15; ash, 3·2; reducing sugars after hydrolysis, 80·15 per cent. In both cases the action of invertin gives a figure for reducing sugars slightly lower than that obtained above by hydrolysis with dilute H_2SO_4. Possibly a carbohydrate, other than saccharose, is present in traces, which is hydrolized by H_2SO_4. The chief constituent of both sugars is, however, cane-sugar.

Tacamahaca Elemi. A. Tschirch and O. Saal. (*Archiv der Pharm.*, 242, 352.) Continuing their researches on the elemis, the authors have investigated tacamahaca elemi. As it occurs in commerce tacamahaca elemi is met with in two forms: one with a crystalline structure, the other amorphous. The crystalline form investigated came from the Philippine Islands. It was firm in consistence and contained bark, sand and earthy impurities. The odour recalled a mixture of fennel, dill and lemon. It had the following percentage composition: Tacamyrin, 30 to 35; α-isotacelemisic acid, 5; tacelemisic acid, 2; β-iso-tacelemisic acid, 3; essential oil, 2; bitter principle, 0·5; resene, 30 to 35 per cent., besides impurities.

Ammonium carbonate solution removes the α-isotacelemisic acid, $C_{37}H_{56}O_4$, which is amorphous and melts at 120°C. Tacelemisic acid and β-iso-tacelemisic acid are then removed by means of NaOH solution; the former gives well-formed crystals, m.p. 215°; the latter is amorphous, m.p. 120. Tacamyrin is separable into α-amyrin, m.p. 181, and β-amyrin, m.p. 192, although the mixture of the two melts at 170°C. Both have the formula $C_{30}H_{50}O$. The resene is amorphous, and melts at 75°C.

Tacamahac Resin, Commercial. A. Tschirch and O. Saal. (*Archiv der Pharm.*, **242,** 395.) The amorphous fragrant resin, of undetermined botanical origin, occurs in yellowish brown pieces the size of a hazelnut. Its percentage composition is: gum, 3; tacamahinic acid, 0·5; tacamaholic acid, 0·5; essential oil, 3; α-takoresene, 50; β-takoresene, 30; bitter principle, 0·5 per cent.; and impurities. Tacamahinic acid, $C_{43}H_{72}O_2$, m.p. 95°C., is amorphous, and is removed by shaking out the ethereal solution of the resin with ammonium carbonate solution. Tacamaholic acid, $C_{15}H_{25}O_2$, m.p. 104–105°C., was then removed by shaking out with Na_2CO_3 solution. The two resenes are separable by alcohol, sp. gr. 0·892, in which α-takoresene is insoluble, and β-takoresene soluble. The former has the formula $C_{21}H_{33}O$, m.p. 93–95°C., the latter $C_{15}H_{25}O$, m.p. about 82°C. It will be seen that this substance differs materially in constituents from crystalline tacamahaca elemi, containing much resene and no amyrin.

Tanacetum boreale, Essential Oil of. (*Schimmel's Report, Oct.*, **1904,** 97.) The half-dried plants cultivated at Miltitz yielded 0·12 per cent. of yellowish oil with a powerful odour of thujone. Sp. gr. 0·9218 at 15°C.; $[\alpha]_D + 48° 25'$; solubility in alcohol 70 per cent. 1 : 8, with abundant separation of paraffin. The oil resembles ordinary tansy oil in properties.

Tartarated Antimony, Detection of Potassium Acid Tartrate in.— Schwartz. (*Répertoire* [3], **17,** 127.) An aqueous solution of pure tartarated antimony is without action on sodium thiosulphate, but $KHC_4H_4O_6$ liberates sulphur. Consequently a saturated aqueous solution of the salt should give, when mixed with an equal volume of N/10 thiosulphate solution, a liquid which remains clear for at least 5 minutes.

Tetranthera polyantha var. citrata, Essential Oil of Bark and Leaves of. (*Schimmel's Report, May,* **1905,** 85.) *Bark Oil.* Yield, 0·81 per cent. of lemon yellow oil; sp. gr., 0·8904; $[\alpha]_D + 10° 11'$; solubility, 1 : 1 and more with alcohol 80 per cent. It contains a mixture of aldehydes, probably citral and citronellal. *Leaf oil.* Yield, 5·42 of bright yellow essential oil; sp. gr., 0·9042; $[\alpha]_D - 15° 41'$; solubility, 1 : 2·5 to 1 : 3 in alcohol 70 per cent. Citral appears to be the only aldehyde present, to the amount of nearly 30 per cent. Cineol is present in the non-aldehydic portion.

Thalassine in Prawns. C. Richet. (*Journ Pharm. Chim.* [6], **20,** 94.) Thalassine is obtained in quantity from prawns, 5 kilos. of those crustaceans yielding 5 Gm. This thalassine possesses all the physiological properties of that obtained from *Actinia*; when injected into dogs in very small doses of 0·1 Mgm. per kilo. of bodyweight, it provokes a general excitement, with intense itching and sneezing. It appears to be widely distributed, and is probably the cause of the toxic pruritus observed under various conditions.

Thorium Salts of Organic Acids for Medicinal Use. G. T. Morgan. (*Pharm. Journ.* [4], **19**, 472.) In view of the therapeutic application of radioactive salts, the following is of interest. Thorium salts of many of the carboxylic acids are insoluble substances, and may be produced by the interaction of their soluble alkali salts with thorium nitrate in aqueous solution, the products being washed with warm water until free from any excess of their generators.

Thorium salicylate, when prepared in this way and dried on porous tile at the ordinary temperature, is obtained in the form of an insoluble pulverulent substance; it is a basic salt, thoria estimations indicating that two molecular proportions of the organic acid have combined with one molecular proportion of the base; the air-dried product contains about 48 per cent. of ThO_2.

Thorium cinnamate is likewise an insoluble powder, containing about 38 per cent. of thoria.

Insoluble thorium salts of a similar nature have also been produced from the three isomeric coumaric acids.

Thorium oleate is prepared by mixing together equivalent quantities of hydrated thoria and oleic acid, the combination being facilitated by the addition of pure redistilled ether: the product, which at first is a perfectly homogeneous paste, gradually acquires the consistence of lard; it is compatible with the ordinary ointment "bases."

An investigation of these compounds from the therapeutic standpoint is being conducted by Lovell Drage, who has employed the oleate rubbed down with olive oil as an ointment in cases of skin trouble of a cancerous or eczematous nature. The other insoluble thorium derivatives have been applied in the form of dusting powders.

Thorium phenol compounds. Similar insoluble compounds are produced on combining thoria with phenol and its homologues. The compounds with phenol, 2 : 4 : 6-tribromophenol, and *p*-cresol are stable substances permanent in the air, but the analogous products obtained from resorcinol, pyrogallol, *a*- and *β*-naphthols, and gallic and tannic acids show a disposition to darken on exposure to the atmosphere. Phthalic and camphoric acids form sparingly soluble thorium salts which are obtained as white amorphous powders.

Thorium lactate, $Th[CH_3{\cdot}CH(OH){\cdot}CO_2]_4,2H_2O$. Lactic acid when combined with thoria furnishes a soluble salt which separated from its concentrated aqueous solutions in opaque white tabular crystals which are somewhat deliquescent. Thorium lactate yields 41·80 per cent. of thoria.

With the exception of the preceding compound the foregoing thorium derivatives are insoluble amorphous substances, to which it is sometimes difficult to assign any definite chemical formula. Well-defined crystallizable salts are obtained, however, by combining thoria with the organic sulphonic acids.

The thorium salts of the sulphonated aromatic hydrocarbons are extremely soluble in water. *Thorium benzenesulphonate* prepared by dissolving the equivalent amount of thoria in an aqueous solution of benzenesulphonic acid, separates in small colourless crystals on evaporating the solution nearly to dryness; when dried at 120°C. it corresponds with the formula $Th(C_6H_5{\cdot}SO_3)_4$. *Thorium naphthalene- a-sulphonate* $Th(C_{10}H_7{\cdot}SO_3)_4$ is also very readily soluble in water, and becomes anhydrous when dried at 120°; the corresponding compound from naphthalene-*β*-sulphonic acid is somewhat less soluble.

Thorium phenol-p-sulphonate (*thorium sulphocarbolate*) obtained by dissolving thoria in an aqueous solution of phenol-*p*-sulphonic acid and concentrating the liquid to the crystallizing point, separates in well-defined, pale pink, transparent prisms, often of considerable size. The analytical data ($ThO_2 = 24{\cdot}33$, $S = 11{\cdot}08$, $H_2O = 14{\cdot}74$ per cent.) indicate that the air-dried salt has the formula $Th(OH{\cdot}C_6H_4{\cdot}SO_3)_4$, $9H_2O$, the calculated percentages being $ThO_2 = 24{\cdot}32$, $S = 11{\cdot}78$, $H_2O = 14{\cdot}91$. This salt has a slightly astringent taste, and is quite permanent under the ordinary atmospheric conditions.

Lewis Jones has made a comparative experiment on the radioactivity of the sulphocarbolate and oleate of thorium. A gelatino-bromide plate was exposed to these compounds for five days, when both were found to have exercised some photographic action, but the sulphocarbolate produced by far the greater effect. The soluble sulphocarbolate obtained by crystallization from aqueous solution was thus shown to be much more radioactive than the insoluble oleate prepared by precipitation.

Analogous soluble compounds may be obtained from the sulphonic acids of *p*-cresol and *a*- and *β*-naphthols. *Thorium β-naphthol-6-sulphonate* $Th(HO{\cdot}C_{10}H_6{\cdot}SO_3)_4$, $9H_2O$, is a colourless crystalline salt; following analytical data :—

Thorium camphorsulphonate, $Th(C_{10}H_{15}O{\cdot}SO_3)_4$, $9H_2O$, prepared from Reychler's camphorsulphonic acid and hydrated thoria, is a well-defined salt crystallizing from aqueous solutions in colourless transparent lustrous prisms.

Thujone. O. Wallach. (*Liebig's Annalen*, **336,** 247, through *Schimmel's Report, May,* **1905,** 111.) The chemically identical thujones of various essential oils are found to be physical isomers. That of thuja oil is *a*-thujone; tansy oil contains *β*-thujone; wormwood oil contains much *β*-thujone, as well as some *a*-thujone; artemisia and sage oils give mixtures of the two. The two thujones were separated by the fractional crystallization of their semicarbazones from methyl alcohol.

Alpha-thujone is lævorotatory, and forms two semi-carbazones, both dextrorotatory, one crystalline and the other amorphous. The ketone separated from the crystalline-compound by means of phthalic anhydride had the following properties: b.p. 200-201°C.; sp. gr. 0·912; $[\eta]_D 22°$ 1·4503; $[a]_D -10{\cdot}23°$. *a*-thujone is partially converted into *β*-thujone when heated with alcoholic potash liquor, formic acid, or alcoholic sulphuric acid. The latter effects a further conversion into isothujone. The oxime, produced without an excess of alkali, remains liquid, and is lævorotatory; when an excess of alkali is used, a dextrorotatory oxime is obtained, due to the isomerization of thujone. If *a*-thujone is converted by reduction into thujyl alcohol, and the latter again oxidized, *β*-thujone is formed. Beta-thujone is dextrorotatory, but is not the optical antipode of *a*-thujone. The semicarbazone occurs in a hexagonal dextrorotatory form, m.p. 174-176°C., which readily passes into a rhombic-hemihedral form, m.p. 170-172°C. When mixtures of the semicarbazones of *β*-thujone or of *a*-thujone, or of both, are present, they give rise to complications which are even more pronounced owing to the fact that mixture-crystals of uniform appearance are formed which can only be split up by frequent recrystallization. The ketone liberated from the semicarbazone by means of phthalic anhydride has the $[a]_D +76{\cdot}16°$. Its oxime melts at 54-55°C., and is dextrorotatory. β-thujone is converted into the isomeric α-thujone by boiling with alcoholic potash.

Thymomenthol. L. Brunel. (*Bull. Soc. Chim.*, **33,** 500.) Thymol is readily converted into the hexahydro-aromatic alcohol, thymomenthol, $C_{14}H_{20}O$, by Sabatier and Senderens' reaction; this is best conducted at a temperature of 160°C., to avoid the simultaneous production of acetone. Thymomenthol is a colourless syrupy liquid, with a powerful peppermint odour; sp. gr. 0·913 at 0°C.; crystallizing at low temperatures to a solid mass which melts at −5° to 0°C.; b.p. 215·5°C. at normal pressure. When dehydrated with P_2O_5 or $KHSO_4$ it gives a tetrahydrocymene or thymomenthene, which closely resembles menthene. Thymomenthol readily esterifies with acids, the alcohol being isomerized during the process, so that when liberated from combination with the acid radicle it is a stereoisomer of the original alcohol. The former has therefore been named α-thymomenthol, the latter β-thymomenthol; it crystallizes in long needles resembling menthol in appearance and odour; m.p. 28°C.; b.p. 217°C. at normal pressure. It volatilizes less readily at normal temperatures than its α-isomer, so that a mixture of the two alcohols may be separated by simple exposure, the ultimate residue consisting solely of crystals of β-thymomenthol. Both α- and β-thymomenthol give the same ketone thymomenthone $C_{10}H_{18}O$, demonstrating that the alcoholic radicle alone is isomerized. Several esters of β-thymomenthol are described in detail.

Trehalase, General Presence of, in Fungi. E. Bourquelot and H. Hérissey. (*Bull. Soc. Mycol.*, through *Journ. Pharm. Chim.*, **21,** 504.) Having previously shown the hexobiose, trehalose to be present in 142 out of 212 species of Fungi examined, and bearing in mind the readiness with which that sugar disappears from various causes during ripening, preservation, or drying, it may be generally inferred that it is universally distributed in these plants. The same is found to be the case, as might be anticipated, with trehalase, the specific ferment which hydrolizes trehalose, affording assimilable products. Trehalase has been found in those Fungi which contain, in the young state only, trehalose and no mannite, such as *Boletus edulis*, *B. aurantiacus*, and *Cortinarius elatior*; in those containing both mannite and trehalose, such as *Boletus badinus*; and in those which contain only mannite and no trehalose, *Paxillus involutus* and *Russula delica*.

Tungsten, Colour Reaction for. C. Frabot. (*Annales de Chim. Analyt.*, **9,** 371.) On adding uric acid to a solution of tungstic salt in the presence of an excess of caustic soda a magnificent blue colour is produced similar to the reaction of phosphomolybdic acid described by Riegler. The latter has suggested the phosphomolybdic test to detect uric acid or urine in water and other liquids. In a similar manner, uric acid may be used as described above to detect tungsten in minerals in the absence of molybdenum.

Turmeric, Composition of. A. E. Leach. (*Journ. Amer. Chem. Soc.*, **26,** 1210.) The following table gives the results of the analyses of the three varieties of turmeric most frequently met with in American commerce :—

Variety	Moisture	Total Ash	Ash Soluble in Water	Ash Insoluble in HCl	Total Nitrogen	Protein, N × 6·25	Total Ether Extract	Volatile Ether Extract	Non-Volatile Ether Extract	Alcohol Extract	Crude Fibre	Reducing Matters by Acid Conversion of Starch	Starch by Diastase Method
China	9·03	6·72	5·20	0·11	1·73	10·81	10·86	2·01	8·84	9·22	4·45	48·69	40·05
Pubna .	9·08	8·52	6·14	—	0·97	6·06	12·01	4·42	7·60	7·28	5·84	50·08	29·56
Alleppi	8·07	5·99	4·74	—	1·56	9·75	10·66	3·16	7·51	4·37	5·83	50·44	33·03
Average	8·73	7·07	5·36	—	1·42	8·88	11·17	3·19	7·98	6·96	5·37	49·73	34·21

Turpentine Oil, Detection of Adulteration in. MacCandless. (*Journ. Amer. Chem. Soc.*, **26,** 981), and Herzfeldt. (*Zeits. fuer Offent. Chem.*, **10,** 382.) *Detection of Petroleum.* 100 c.c. of the oil is gradually mixed with agitation and cooling with 50 c.c. of H_2SO_4. When action is complete, 25 c.c. of water is added and the mixture distilled. When the total distillate amounts to 100 c.c. the distillation is stopped. The quantity and refractometer number of the oil is ascertained, and it is again treated, as before, with strong fuming H_2SO_4. The mixture is poured into water and the separated oil again distilled. The process of treatment with acid and distillation is repeated a third time with double the volume of fuming H_2SO_4. In the case of pure turpentine and pine oil the refractometer number at 25°C. with a Zeiss butyrorefractometer never falls below 30. The presence of petroleum influences this figure very markedly, one per cent. of that adulterant lowering the refractometer value of the third polymerization to 25.

Detection of Pine-tar Oil. When petroleum is proved absent, 100 c.c. of the oil is carefully distilled, and the refraction of the first 0·5 c.c. of distillate determined. In the case of pure turpentine it is 60 to 63 at 25°C. When pine oil is present it is below 60. On continuing the fractionation, the 97th and 98th c.c. are again tested by the refractometer; with genuine turpentine, this will not exceed 77°; but with wood spirit may reach 90°.

Turpentine Oil, Greek, from Pinus halepensis. —Utz. (*Apotheker Zeit.*, **19,** 678.) The fresh turpentine of *Pinus halapensis* yields from 20 to 22 per cent. of oil and 70 per cent. of colophony. As a rule the turpentine is not distilled direct, but the oil is obtained from the residues of the Greek terebinthinous red wines, to which the fresh turpentine is added as a preservative and to impart the peculiar resinous flavour which is distinctive of these wines. Consequently the turpentine oil thus prepared has an agreeable resinous aroma. It has the sp. gr. 0·8634 at 15°C.; $[\alpha]_D$ 38° 47′; solubility in 90 per cent. alcohol, 1 : 12; b.p. 150–155°C.

Umbelliferone Test, Modification of. F. H. Alcock. (*Pharm. Journ.* [4], 19, 112.) Instead of boiling the gum resin to be tested with strong HCl, gentle boiling with equal volumes of HCl and water is recommended as giving less inconvenience from the evolution of fumes: on diluting, filtering and adding ammonia the fluorescent umbelliferone reaction is obtained as definitely as when strong acid is used.

Vanillin, Adulteration of, with Terpin Hydrate. (*Schimmel's Report, May,* **1905,** 120.) A sample of vanillin from a Swiss source recently offered has been found to be adulterated with 50 per cent. of terpin hydrate; it had no definite melting point, and developed the odour of terpineol when heated with dilute H_2SO_4.

Vanillin and Hydrochloric Acid as a Reagent. L. Rosenthaler. (*Zeits. für Analyt. Chem.*, **44,** 292.) A 1 per cent. solution of vanillin in HCl gives characteristic colours with phenols, ketones, terpenes and other bodies. A few drops or particles of a solid are added to the reagent, and the colour noted in 15 minutes; it is then heated to boiling, when another tint may be developed. A green colour is given by essential oils containing *pinene*, or *limonene*; sesquiterpenes give no reaction. Essential oils containing *linalol* or *geraniol* give a violet colour; those which contain *cineol* give a blue tint on heating. *Clove oil*, when pure, gives no reaction. *Morphine* and *codeine* give a violet red colour on heating: acetone and its homologues a pale pink colour in the cold, becoming green on heating.

Vinegar, Commercial, Presence of Acetylmethylcarbinol in. — Pastureau. (*Journ. Pharm. Chim.* [6], **21**, 593.) Several specimens of commercial vinegar have been met with which gave more or less precipitate with alcohol 95 per cent., and showed a powerful reducing action, in the cold, on alkaline cupric tartrate. When neutralized with Na_2CO_3 and distilled the reducing body passed over in the distillate, giving an abundant precipitate of CHI_3 when treated with iodine, and a crystalline osazone, m.p. 243°, with phenylhradrine acetate. By this osazone it was recognized as that of methylacetol, or acetylmethylcarbinol $CH_3.CO.CHOH.CH_3$. The solution of the osazone in ether-alcohol gave a blood-red colour with a trace of Fe_2Cl_6, and, on evaporation, red crystals of the corresponding osotetrazone. No furfural was detected in the distillate from the neutralized vinegar. To determine the amount of methylacetol present, 50 c.c. of the vinegar was neutralized with Na_2CO_3 and distilled to dryness, avoiding overheating. The distillate received in a graduated 100 c.c. flask was rendered alkaline with NaOH and AmOH, then treated with 10 c.c. of N/10 $AgNO_3$. After standing for 24 hours. the volume was made up to 100 c.c., the liquid filtered, and the silver remaining determined by the cyanometric method. The amount of methylacetol present was then calculated from the quantity of $AgNO_3$ found to be reduced according to the equation :—

$$3(CH_3.CO.CHOH.CH_3 + AgNO_3 = 3(CH_3.CO.CO.CH_3) + 3H_2O + N + Ag.$$

In one case this was found to be equivalent to 3·256 Gm. per litre.

Volatile Acids, Distribution and Formation of, in Plants. E. Charabot and A. Hébert. (*Bull. Soc. Chim.* **1904**, [3], 31, 1107.) The greatest amount of free volatile acids is invariably found in the leaves of various plants, such as peppermint, basil, various oranges, and other species yielding volatile oils; the least occurs in the inflorescences until drying up of the plant commences, then free volatile acid is found in the lowest amount in the stem. The relative proportion in the different organs increases and decreases simultaneously, becoming less at the period of the formation of the inflorescence, particularly in the leaves, and increasing as the flowers expand, to finally diminish when the plant dries up. Etiolated plants show a decidedly greater proportion of volatile acid, calculated on the dry material, in all their organs than similar plants grown exposed to light. The proportion of combined acids is also greater in the leaves than in the stem. In examining the ash of various organs it is found that soluble carbonates, and especially that derived from organic salts of potassium, are chiefly found in the ash of the stem. The least proportion of soluble carbonates exists in the inflorescence ash. The ash of the leaves affords the highest proportion of insoluble carbonates derived from organic salts of magnesium and calcium. Etiolated plants show an exaggerated amount of combined acids, but the suppression of the inflorescences reduces the amount.

Water, New Reaction for the Detection of Ammonia in. A. Trillat and Turchet. (*Comptes rend.*, **140**, 374.) The reaction is based on the formation of a black colour due to nitrogen iodide, when KI and an alkali hypochlorite is added to a solution containing ammonia. The reaction is distinctly visible with 1 part of NH_3 in 500,000. It is claimed that it has the advantage over Nessler's reaction in not being affected by the presence of bicarbonates, lime salts, sulphides, and albuminoids. The reaction is given only by ammonia, and not by nitrites, nitrates, amines or other nitrogenous compounds. The test is thus applied. Twenty to 30 c.c. of the water in a Nessler glass is treated with 3 drops of 10 per cent. KI solution, and 2 drops of strong alkali hypochlorite (solution of chlorinated soda answers well). The black colour is at once formed in the presence of NH_3, and is sufficiently permanent to allow the depth of tint to be matched, with a standard solution of ammonia, as in "Nesslerizing." Only one precaution is essential, to avoid adding an excess of the reagent, in which the nitrogen iodide formed is redissolved.

Water, New Reaction for Determining Ammonia in. — Cavalier and Arthus. (*Bull. Soc. Chim.*, **33**, 745.) Commenting on the preceding, the authors state that the reaction is much less delicate than the familiar Nessler test, and that the dark colour is not permanent, diminishing sensibly in a minute and almost disappearing when not very intense, in about 3 minutes.

Zinc Borate or Oxyborate. E. Holdermann. (*Archiv der Pharm.*, **242**, 567.) This salt, the formula of which may be written $Zn_3(B_4O_7)_2(OH)_2$, is prepared by dissolving zinc sulphate 500 Gm. in 5 to 10 litres of water, to which a solution of borax, 443·6 Gm., containing caustic soda solution, 15 per cent., 309 Gm. is added with constant stirring. The precipitate is then washed, collected and dried. It forms an excellent dusting powder for medicinal use.

Zygadernus venonosus Bulbs, Alkaloids of. H. B. Slade. (*Amer. Journ. Pharm.*, **77.**) The bulbs of death camas of the Nez Percé Indians, *Zygadernus venonosus*, have been found to contain at least three alkaloids, sabadine, sabadinine and veratralbine, showing the close relation of the plant in chemical constituents to *Veratrum album.* Sabadine was extracted from the air-dry powdered bulbs by ether, and purified by precipitation with phosphotungstic acid, from which it was liberated with sodium carbonate, then crystallized with ether. Sabadinine was isolated from the ether extract after the removal of sabadine. Veratralbine was extracted from the drug, after treatment with ether, by means of 80 per cent. alcohol containing tartaric acid,

MATERIA MEDICA

PART II

MATERIA MEDICA

Abies amabilis, Oleoresin of. F. Rabak. (*Pharm. Review*, **23**, 46.) According to the author, Oregon balsam is furnished by *Abies concolor*, *A. amabilis*, and *A. nobilis*. An authentic specimen of the oleoresin of *A. amabilis* was pale yellow in colour and had an odour recalling that of limonene. It was faintly turbid ; its 10 per cent. solutions in alcohol and in ether were devoid of optical activity. It yielded **40·3** per cent. of essential oil on distillation. This had the sp. gr. **0·852** at 22°C., and the $[a]_D -14^\circ\ 24'$. Its chief constituents are pinene, with a little limonene. The characters of the oleoresin of *P. amabilis* differ both from Canada balsam and from commerical Oregon balsam.

Acetopyrine. (*Merck's Report*, **18**, 1.) J. Reichelt has successfully employed acetopyrine in rheumatism, influenza, sciatica, lumbago, intercostal neuralgia, coxalgia, migraine, and cephalgia of a rheumatic origin, bronchitis, pneumonia, angina, herpes zoster and tuberculosis of the lungs. He finds it especially valuable in rheumatism, where doses of 8 grs. were taken with ease and did not produce secondary effects upon the heart. Also it alleviated the pains and induced quiet sleep.

Very good results were likewise obtained by G. Spuller in the treatment of articular rheumatism.

J. Winterberg and R. Braun have employed acetopyrine not only in chronic articular rheumatism, but also in typhoid, meningitis cerebrospinalis, and pleuritis, and secured favourable results. They emphasize the fact that the use of acetopyrine was not attended with prejudicial effects upon the stomach.

Acorus calamus Root in India. D. Hooper. (*Pharm. Journ.* [4], **19**, 206.) The rhizome of the sweet flag is sold in nearly every bazaar in India, and has been known from the earliest times as a favourite medicine with the natives of Eastern countries. It is administered for such divers complaints that it is difficult to discover its peculiar action. In small doses it is stomachic and carminative, in larger doses it is considered emetic. It is a simple and useful remedy for flatulence, colic, or dyspepsia, and a pleasant adjunct to tonic or purgative medicines. It is considered efficacious in remittent fevers and ague. From the opinions of medical officers collected in India, acorus root has been pronounced to be good for dysentery of children, as an expectorant in bronchitis, as a fumigatory in painful piles, and as a counter-irritant to the chest in catarrh. It is administered in the form of an infusion, decoction, or tincture. In Ceylon, the rhizome is used as an anthelmintic for children.

Sweet flag root is held in high esteem as an insectifuge, especially for fleas. For this purpose the dried plant is placed with clothes in drawers and almirahs and under beds. It is generally supposed that the smell is disliked by the cobra, on which it produces a narcotic effect. In the Ratnagiri district, Bombay, it is cultivated for this purpose near dwelling-houses, and is chewed by snake-charmers.

Clinical experiments with the essential oil distilled from fresh and dried roots at Ootacamund, and with a strong tincture of the root, have failed to indicate that it has any appreciable therapeutic action.

Adrenaline, Therapeutics of. (*Merck's Report*, **18**, 13.) The application of adrenaline in conjunction with cocaine has now become general for simultaneously lessening hæmorrhage and producing anæsthesia during operation. The 1 : 1000 solution has been given internally with success by A. C. Bird and Gray Duncanson for the arrest of pulmonary hæmorrhage, the dose being 5 to 20 ♏ ; and A. S. Myrthe has given it in the same way for cardiac attacks in neurasthenia. Cosma, however, regards it as a feeble hæmostatic when it has passed through the system, since it is so readily oxidized. Its action, according to him, is doubtful in hæmoptysis, metrorrhagia and intestinal hæmorrhage, but good results were obtained in epistaxis and hæmaturia. Ichard and Martin have employed it with success as a local application for carcinoma. To obviate decomposition Livon suggests the addition of 6 per cent. of HCl to the 1 : 1000 adrenaline solution, and states that this enables it to retain its activity unimpaired for a year. Grandclément has found the 1 : 5000 solution to be a valuable remedy for acute glaucoma; by keeping the eye constantly under the influence of adrenaline for three days, by half-hourly application, iridectomy may be avoided. It has also been used with good effect for rhinitis and other nasal affections. Hecht prescribes the following snuff for the purpose: Zinc sozoiodolate, 5 to 15 grs.; menthol, 3 to 8 grs.; adrenaline (crystalline), $\frac{1}{64}$ to $\frac{1}{32}$ gr.; powdered milk sugar, 145 grs. In dental operations Luniatscheck uses the following solution: Adrenaline solution, 1 : 1000, 3 ♏; solution of cocaine hydrochloride, 0·5 per cent., 16 ♏. An ointment for deep-seated hæmorrhoids is composed of adrenaline solution (1 : 1000), 30 ♏; cocaine hydrochloride, ½ gr.; vaseline, ½ oz. Many authors sound a note of warning against the indiscriminate use of adrenaline. Greve refers to dental cases in which severe secondary hæmorrhage has followed its use. Kantz regards it as a cardiac poison, and insists on the importance of examining the patient's heart before its administration. Oppenheimer records a case of severe reactionary hæmorrhage in a case of advanced iritis, and recommends care in its use in cases of high inflammation or with the aged. In the latter he is confirmed by Aronheim and Neugebauer. It is contra-indicated in advanced cases of Addison's disease, in which Boinet records two fatal cases following its use, but it may be employed with benefit in the initial stages of the affection, but even then the dose should not exceed $\frac{1}{200}$ of a gr. Mengelberg finds that, when combined with atropine sulphate in ophthalmic surgery, adrenaline is liable to exert a toxic action, and should be administered with extreme caution. These results show that, although adrenaline is undoubtedly a most valuable remedy, its use demands circumspection and a close regard to the condition, or idiosyncrasy, of the patient.

Airol as a Diagnostic in Carious Aural Inflammation. (*Merck's Report*, **18**, 18.) Kutvirt describes airol as a good diagnostic medium in carious inflammations of the ear. It is found that as soon as this disease extends to the bones several species of bacteria contribute to the evolution of SH_2, which does not occur under normal conditions. This SH_2 blackens bismuth iodogallate or airol. When airol gauze is blackened on being introduced into a suppurating ear, it is a very strong indication that the inflammation extends to the bone.

Almatenia. L. Bertini. (*Clinic Mod.*, through *Répertoire* [3], **17,** 78.) Almatenia is a condensation product of hæmatoxylin and formaldehyde, which occurs as a very light, odourless, tasteless, brick-red powder with a metallic reflection. It is employed as a surgical antiseptic dressing, as one of the many substitute, for iodoform.

Anesthesine, Application of, for Mouth Diseases. Hoenigschmeid. (*Heilkunde*, through *Merck's Report*, **18,** 22.) The following application is recommended for various mouth affections of children, such as catarrhal stomatitis, thrush, and buccal ulcers. It is applied with a brush. Oil of sweet almonds, mucilage of acacia, rectified spirit of each, ½ oz.; emulsify and add, anæsthesine, 15 grs.; simple syrup, ½ oz.

Antipyrine and Pyramidon, Separation of. — Patein. (*Journ. Pharm. Chim.* [6], **21,** 611.) On treating a mixture of pyramidon and antipyrine with HCl and formaldehyde, the former is not affected, but the latter gives a compound which is precipitated by ammonia. This may be collected and weighed, when the pyramidon may be dissolved out of the liquid by shaking out with $CHCl_3$ and obtained as a weighable residue on evaporating off the solvent.

Atoxyl. J. Moller. (*Berlin Klin-Therap. Woch.*, through *Merck's Report*, **18,** 33.) Atoxyl, metarsenic anilide, has been employed with excellent results as endovenous injections for the treatment of the first and second stages of phthisis. A series of cases is recorded in which such good results have been obtained that the treatment is regarded as a specific. From ⅔ to 1 syringeful (1 Gm.) was injected every alternate day for 5 or 6 days, the succeeding 5 or 6 doses being given every third day, then every fourth day, and, finally, once a week. In small doses it has also proved beneficial in valvular affections of the heart and in myocarditis. It has also been successfully employed in other affections. (See also *Year-Book*, **1902,** 162; **1903,** 194.)

Atropine Methyl Bromide, Therapeutics of. (*Merck's Report*, **18**, 34.) In addition to the cases already described (*Year-Book*, **1904**, 193) Aronheim gives the following prescriptions, and indicates their respective applications.

In cystitis good results were invariably obtained with 2 daily doses of $\frac{1}{32}$ gr. each of methylatropine bromide and 15 grs. of urotropin; in insomnia by the administration of a powder of $\frac{1}{32}$ gr. of methylatropine bromide and 8–15 grs. of veronal; in feverish and catarrhous affections and in neuralgia, with $\frac{1}{32}$ gr. of methylatropine bromide in conjunction with 8–12 grs. of phenacetin. The following prescription relieves spasmodic night-cough: Methylatropine bromide, $\frac{1}{3}$ gr.; cocaine hydrochlor., 3 grs.; cherry laurel water, 150, grs. 15 to 20 drops to be taken in the evening in a cup of a suitable pectoral.

In dyspepsia with heartburn: Methylatropine bromide, $\frac{5}{6}$ gr.; sodium bicarbonate, bismuth salicylate, āā 75 grs.; Peppermint oil, gtt. 10; milk sugar to 1 oz. As much as will lie on knife-point to be taken in water 4 times daily after meals.

In epilepsy he prescribes: Methylatropine bromide, $1\frac{1}{2}$ gr.; antipyrine, 24 grs.; ammon. bromide to 3 oz. As much as will lie on a knife-point to be taken in water 3 to 4 times per day.

Hypodermic injections of $\frac{5}{6}$ gr. of atropine methyl bromide in 150 ♏ of cherry laurel water may be given in doses of $\frac{1}{4}$ to 1 syringeful according to age, and has given good results in relieving pain in various cases. Bolgar has also obtained good results with the drug, especially in intestinal affections, in which its influence on the peristaltic action surpasses that of atropine.

Aya-Pana, True and False. P. Planès. (*Journ. Pharm. Chim.* [6], **21**, 534.) Although the leaves alone of *Eupatorium triplinerve* form the true drug, as met with in commerce Aya-Pana frequently contains 40 to 50 per cent. of fragments of stems, which are valueless. Nor does sophistication end at this; a specimen has lately been met with which contained a considerable admixture of the stems of *E. cannabium*. Since the deeply trilobed dentate leaves of the latter are quite distinct from the single-lobed lanceolate leaves of the geniune article, these had been carefully removed, the remaining stems being sufficiently similar to those of true Aya-Pana to pass a superficial examination. The market value of the leaves of *E. triplinerve* is about twelve times greater than that of those of *E. cannabium*, so the fraud is very remunerative. The microscopical examination of the stems at once distinguishes them. The transverse section shows that the epidermis of *E. cannabium* is covered with hairs, which are absent in *E. triplinerve*; the subadjacent cortical tissue is collenchymatous; the endoderm has two receptacles of secretion opposite each fibrovascular bundle. These are very regularly arranged in the pericycle and are 25 in number, and quite distinct in shape and structure from those of Aya-Pana. This has a parenchymatous cortical tissue, the fibrovascular bundles are not so numerous nor so regular, and are flattened. Figures illustrating the marked difference of structure of the two leaf stems are given.

β-eucaine Lactate. F. Zernick. (*Berichte Pharm.*, **15,** 6.) Since β-eucaine hydrochloride is but sparingly soluble in water, Langaard has proposed to substitute the lactate, the solubility of which is 1 : 4·4 in water, for pharmaceutical preparations.

β-Naphthol as a Vermifuge. (*Merck's Report*, **18,** 128.) β-naphthol is stated to be a harmless and effective remedy in anchylostomiasis and other affections due to intestinal worms. After a purgative, 15 grs. of β-naphthol is given, and repeated after a few hours, the patient meanwhile being kept on fluid diet.

Borneo Camphor, Collection of, by the Malays. E. Kremers. (*Pharm. Review*, **23,** 7.) H. Furness thus describes the collection of Borneo camphor by the Malays :—

When the " Kayans " are about to undertake a search for the trees which are to supply the valued camphor, they first of all make very careful observations of certain external occurrences which they consider as good or evil omens for the result of their undertaking. It is especially the flight of certain birds, such as the spider-hunter, the red hawk, or the rainbird, on which the result of the search depends. If they see one of these birds cross their path from right to left, there is but small prospect of a good haul; but if they see the birds fly in the opposite direction, they consider it a portent of a good result of their expedition, and only when the omens are satisfactory do they proceed on their way. But before the work can be commenced they must hear the troat of a stag, and finally must kill a certain kind of snake. Only when all this has taken place they may hope to find a rich harvest. Next they place a rattan across a stream near which the camphor trees are found which they intend to fell, and suspend from that rattan wooden images, weapons, and wooden wedges, of which the latter are intended to be used in the subsequent work of splitting up the tree. For other camphor hunters or strangers this is meant to be a sign that the stream is barred. They next put up their hut in the vicinity of the trees to be felled. Now, if at the first blows of the axe one of the above-named ominous birds is heard to call, they immediately leave off working until the next day, spending the time meanwhile in their hut in idleness. When all the signs are favourable for the camphor hunters, and if the tree is found to contain a sufficient quantity of camphor, a post is erected which is clothed with chips and brushwood (the chips are possibly intended to represent the sinuous tongues of fire which are connected with the invisible powers). During the gathering of the camphor the "Kayans" are allowed to take food and to speak to people whom they meet, but no stranger is allowed to enter their hut. When the tree is felled, it is cut up in small pieces by the hunters, who for this purpose dress themselves in fine clothes and put on arms. They therefore consider it as a fallen enemy, of whose hidden treasures they can only possess themselves by means of sword and spear. The search for crystals is extremely troublesome, as every piece of wood has to be cut up small and tested with the greatest care. The trees which contain crystals are usually hollow. Up to a height of 20 feet above the roots small crystals are found. In addition to these, much oil is always present. The flowers possess a powerful odour of camphor. Many tribes of Borneo are in the habit, when searching for camphor, of employing a special "camphor-language," to which the "Malanau" pay special attention, as they believe that the crystals will immediately disappear when another language is spoken. With regard to this camphor dialect, one is inclined to consider this an interesting remnant of an old language. This peculiar habit prevails throughout Borneo and the Malay Peninsula. With some tribes the names of the chiefs and influential persons are not allowed to be mentioned as long as the search for camphor continues. If anybody should violate this rule, no camphor would ever be discovered in the trees. During this period the women do not dare to touch their combs. The men are able to discover from certain knots in the tree whether their wives are faithful, and it is said that, in olden times, jealous husbands have killed their wives in consequence of the signs which they had read from these knots. Except during the day or at nightfall no one is allowed to bathe ; no venison must be eaten during this period. The finest camphor is considered to be that which is found in large transparent crystals ¾ inch long, and for which 40 to 50 dollars per pound is paid at the upland markets. The ' Punans " are said to be the principal gatherers of camphor. They either hire themselves out to the Kayans, Kenyahs, Sibops or Ibans as guides and servants, or they collect the camphor themselves, and exchange it with the neighbouring tribes, who in turn sell it to the Chinese. The yield from a single tree varies considerably. It is said to be between 3 and 11 pounds. The gathered camphor is carefully selected and sold in three kinds of which the largest and purest crystals are the best ; the smallest are grey and as fine as dust. In view of the high price which is paid for this drug, it stands to reason that it does not come under consideration for European trade. The enormous price paid in the Orient is, of course, explained by the use of Borneo camphor for religious purposes.

On the Chinese market there is a brisk demand for camphor, but some of it finds its way to Japan and other countries. The quantity imported in Canton in 1872 amounted to about 27,7 piculs, or 3,159 lbs., representing a value of 42,326 taels (80*s.* per lb.).

Bornyl Valerianate (Bornyval) as a Nervous Sedative. O. Engels. (*Therap. Monats.*, **18,** 235.) Bornyl valerianate is a useful sedative in traumatic neuroses, hysteria, neurasthenia, epilepsy, and is specially suitable for administration to children. It increases the appetite, and is free from any unpleasant secondary effects.

Burmese Drugs. D. Hooper. (*Pharm. Journ.* (4), **19,** 956.) Since the annexation of Upper Burma in 1885, very few new drugs have been brought to light. Among these may be mentioned " Thansa," the extract of *Terminalis oliveri,* used as a substitute for cutch, which may be considered one of the most important drugs of Burma (*Year-Book,* **1901,** 120) ; the second " A kyau " wood, *Aquilaria agallocha,* from the Mergui Archipelago (*Year-Book,* **1904,** 190) ; and the third the balsam of *Altingia excelsa,* or Burmese storax, from Tenasserim (*Year-Book,* **1902,** 30).

The most recent contribution to our knowledge of Burmese drugs has appeared in a paper on "The Vegetation of the District of Minbu in Upper Burma," by Captain A. T. Gage, I.M.S., curator of the herbarium, Royal Botanic Garden, Calcutta.

Taraktogenos kurzii, King, "Kalawbin" of the Burmese, the tree yielding commercial chaulmoogra seeds, was met with in the Arracan Yomahs, and it was ascertained that the oil is used for leprosy in conjunction with that obtained from the seeds of *Semecarpus albescens*, Kurz, the "Chithee" trees. It is also found in Assam, Chittagong, and the Malay Peninsula.

There are numerous cosmetics sold in the bazaars which are used by women to improve the complexion. One of the powders used in Minbu is that of the bark of *Limonia acidissima* (Thanaka), which is powdered and made into a paste, and applied to the face. Lest women should become too attractive at a certain age it is the custom in some parts of the country to use powders with an opposite effect. Under *Cinnamomum tamala*, Gage states that: "The Chin women undergo about the age of fourteen the ordeal of having the whole face closely tattooed black, which gives them a grotesquely hideous appearance. The legend runs that this curious practice originated in the desire to render the Chin women repulsive to the Burmese officials, who were wont to carry off the more comely amongst the maidens to adorn their harems. Formerly the leaves of *Cinnamomum tamala* were pounded down, and a solution made with water, which was employed to produce this most uncosmetic effect. Nowadays the more prosaic lampblack is used."

The presence of saponin in the fruits of *Acacia concinna* and *Gardenia turgida* render them useful, as in South India, for washing the hair and clothes. The tubers of *Gloriosa superba* are a violent poison, and are partaken of by Burmese women as a means of committing suicide under stress of blighted affections.

Other drugs met with were :—

Aerva javanica, Juss. ("On-bwe"). A paste of the root is used as an application in acne-like conditions of the face.

Ardisia humilis, Vabl. ("Shadwé"). All parts of the plant are used in the treatment of menstrual disorders.

Arundo donax, L. Root used as a diuretic.

Buddleia asiatica, Lour. A paste of the root is taken in rice water by the Chins as a tonic.

Capparis flavicans, Wall. Leaves are used as a galactogogue.

Capparis hastigera, Hance ("Namanee-thanyet-gyi"). A paste of the root is used as an application to sores.

Chenopodium album, L. ("Myu"). A paste of the root used in treating the diarrhœa of children.

Chrozophora plicata, A. Juss. ("Gya-sagauk"). A decoction of the whole plant used in treating gonorrhœa.

Cissampelos pareira, L. ("Kywet-nabaung"). A paste is made from all parts of the plant and used as a local application in inflammatory conditions of the eye.

Croton oblongifolius, Roxb. ("Thetyin-gyi"). Leaves used in hot fomentations to allay inflammation, either strained in a cloth or first made into a paste.

Dioscorea bulbifera, L. ("Khadu"). Used as a galactogogue.

Elephantopus scaber, L. A decoction of the stem and leaves is used in menstrual disorders.

Euphorbia antiquorum, L. ("Teinganeik-tazaung"). The branches are sliced, dried and powdered, and administered to check profuse lochial discharge.

Heliotropium indicum, L. ("Hsin-hnamaung-bin"). A decoction of the whole plant used in treating gonorrhœa.

Leucæna glauca, Benth. ("Aseik-hpye-bin"). A paste of the leaves is applied for poisonous bites or stings.

Polygonum tomentosum, Willd. ("Wetkyien"). A decoction of the root is used in children's stomachic troubles.

Premna latifolia, Roxb. ("Seiknan-gyi"). A paste of the root is used as a local application after parturition.

Rosa involucrata, Roxb. ('Myit-king"). A decoction of the root is used as a mouth-wash in dental caries.

Sphæranthus indicus, L. A decoction of the whole plant pounded down is employed as a tonic drink.

Sphæranthus peguensis, Kurz. ("Kodu-bin"). A paste of the leaves is used as a styptic, and in hot fomentations.

Streblus asper, Lour. ("On-hne-hin"). A decoction of the dried leaves is administered in dysentery.

Ventilago calyculata, Tul. ("Thwe det"). A paste of the root is applied locally to excite granulation in wounds.

Viscum orientale, Willd. ("Kyibaung."). A paste of the powdered leaves is used as a local antiphlogistic.

Cattle medicines are represented in the three remaining drugs. A paste of the root of *Acacia farnesiana* ("Naulong-yaing") is applied to the hoofs of cattle as a parasiticide, or as a preventive of the attacks of parasites. The plant, *Ocimum* *canum* ("Pin-zein"), is used as a diuretic medicine for horses. A decoction of the plant, *Xanthium strumarium* ("Si-hnè"), is given as a tonic drink.

Calcium Chloride for Bleeding Hæmorrhoids. — Boas. (*Therap. der Gegenwart.*, through *Merck's Report.* **18,** 39.) The rectal injection of 3 drs. of a 10 per cent solution of pure crystalline calcium chloride administered in the morning, after evacuation, has given excellent results ; in grave cases a second injection may be given in the evening. The treatment should be continued for some time after hæmorrhages have ceased.

Calumba Root, so called False. E. M. Holmes. (*Pharm. Journ.* [4], **19,** 892.) The supposed adulterant of calumba noticed by Wardleworth, attributed by him to *Tinospora bakis*, and which was found by Alcock to yield an abnormally high percentage of ash (*Year-Book*, **1902,**) is considered to be merely the woody root-stock or upper portion of the root from which spring the fasciated tuberous roots forming the drug. This is borne out by Perrédès from the microscopic structure of the supposed adulterant.

Carbolic Acid in Hypodermic Injections. (*Merck's Report*, **18,** 3.) Carbolic acid is now extensively used in the form of subcutaneous injections for the treatment of tetanus, and numerous favourable results justify this mode of treatment. G. Leone reports on a very grave case of tetanus which subsided after treatment for 21 days, involving the use of a total of 104 grs. of phenol administered in the form of a 3 per cent. solution. Similar successes are recorded in mild as well as grave cases by F. A. Corte, C. Boehm, A. Bertelli, and A. Rabitti. The last named administered during the first 2 days 3 injections of 3 grs. of carbolic acid and subsequently only 1½ gr. in the form of an oily solution, so as to render the absorption less violent. . Mastri injected subcutaneously quantities not exceeding 11 grs. per day and administered sodium sulphate subcutaneously for the purpose of inducing the formation of phenol sulphate, but he abstained from the use of sedatives, such as morphine. In veterinary medicine subcutaneous injections of phenol have likewise proved useful in tetanus.

For the treatment of otitis interna A. Hartmann recommends a solution of 145 grs. of carbolic acid in 3 oz. of glycerine, which in a short time after its instillation removes the most violent pains without affecting the tympanum or giving rise to other unpleasant symptoms.

C. Mauro has prescribed it with success in chorea as follows : Acidi carbolici cryst., 1·5 Gm. (24 grs.) ; glycerini, 5·0 Gm. (75 grs. ; Aq. dest. steril., 45·0 Gm. (1½ oz.).

This solution is injected into the gluteal region in doses of 1 c.c. or 16 ♏ 2 or 3 times daily. A case is cited in which articular pains disappeared in 3 days, the spasmodic movements were lessened in 8 days, and a complete cure effected in 3 weeks.

Cephalophine. (*Journ. Pharm. Chim.* [6], **20,** 359.) Cephalophine is the name given to an oily extract of fresh nerve-substance. It is not toxic, and may be administered by hypodermic injection, and even in large doses does not provoke any local reaction. It is a powerful antitoxin to strychnine, and differs from ordinary extracts of nerve substance in that it acts in 80 per cent. of the cases in which it has been tried, in preventing a fatal result when injected in the neighbourhood of the strychnine injection, whereas the former must be injected into the same spot to exercise inhibitory effect. Animals which have been treated with cephalophine are immune to a lethal dose of strychnine for 5 days. Cephalophine has been employed with success in a number of nervous diseases, such as neurasthenia, hysteria, neuralgia and chorea.

Chlorethoform. Finnemore and Wade. (*Répertoire* [3], **17,** 124, after *Pharm. Rundschau.*) This name is given to chloroform from ethyl alcohol to which 0·25 per cent. of ethyl chloride has been added. It is claimed that chloroform prepared from ethyl alcohol contains a trace of ethyl chloride, which renders its anæsthetic action more certain and safer than that of chloroform prepared from acetone.

Chloroform as a Tænifuge. (*Merck's Report*, **18,** 44.) Attention is again directed by Léger to the value of chloroform as a vermifuge for tapeworm, being as efficacious as any other drug for the purpose. The patient is placed on a milk diet, and, in the evening, a purging enema is administered ; the next morning the following mixture is taken in 4 doses at intervals of 45 minutes : Chloroform, 60 grs. ; simple syrup, 1 fl. oz. ; distilled water, 4 fl. oz. Between the third and fourth dose an ounce of castor oil should be given.

[The same treatment was prescribed by Thompson, *Year-Book*, **1887**, 282.]

Chloroform as an Antidote to Poisoning from Nitrous Oxide. Weisskopf. (*Merck's Report*, **18**, 45.) Chloroform in doses of 3 to 5 drops in water every 10 minutes, but not exceeding a total dose of 24 grains in 24 hours, is recommended as an antidote against the toxic action of nitrous oxide and the spasms of the motor sensory system which it provokes.

Cochlospermum gossypium, Gum of. P. Lemeland. (*Journ. Pharm. Chim.* [6], **20**, 253.) This Indian gum appears in commerce as Kutera or Kutira gum. It occurs in bright-coloured, very hard tears, with but little foreign admixture. Some pieces are brilliant and quite transparent, others dull and opaque; the smaller weigh about 15 Gm., the larger about 50 Gm. Sometimes bright and dull portions are seen in the same piece. All have numerous circular or elliptical striæ on the surface; the fracture is dull. It contains 22·7 per cent. of moisture, consequently it cannot be reduced to fine powder. It is but little soluble in water, but the insoluble portion swells to form a dense mucilage, which settles to the bottom of the vessel. This mass has but little cohesion, and the supernatant liquid no appreciable viscosity. The soluble portion only amounts to 2·039 per cent. This has the $[\alpha]_D + 77° 152'$. The gum contains no ferments. On hydrolysis it yields 25·636 per cent. of pentoses and 34·995 of dextro-galactose.

Convallaria, Therapeutics of. — Laigre. (*Répertoire*, **16**, 508.) The juice of the fresh plant of *Convallaria majalis* is stated to possess greater activity than the extract usually prescribed in France. It is found to contain 0·225 per cent. of convallamarin and 0·12 per cent. of convallarin. It differs in action from convallamarin; although its tonic action on the heart is the same, it possesses greater diuretic properties. It is given in doses of 8 to 24 grs. per diem.

Diacetylmorphine Hydrochloride. D. B. Dott. (*Pharm. Journ.* [4], **20**, 440.) The acetyl derivatives of morphine were first prepared by Beckett and Alder Wright—that is to say, in London;

not in Germany, as has been asserted. Whatever may be its therapeutic value, the diacetyl compound enjoys at present a certain amount of favour, being probably best known among medical men as "heroin." Should this derivative obtain a place in the Pharmacopœia, it will doubtless be entered under its proper chemical name, or otherwise have a new name coined for it, after the manner of phenazone and gluside.

The hydrochloride is the salt in general use, but it by no means follows that it will be officially adopted. This salt melts at 117°C. (or near it). It is readily soluble in water, about 1 in 10. 0·4 Gm. dissolved in 4 c.c. water and 0·1 Gm. sodium bicarbonate added yields after several hours a precipitate which, when collected on a small filter, washed with 6 c.c. water, and dried in water-bath, weighs 0·3 Gm. This precipitate is easily soluble in chloroform. It melts at (or near) 169°C. The hydrochloride seems to contain two molecules of water, of which one is lost under 100°C., the remaining portion at 120°C.

It has not been sufficiently noted that the base and its salts are very easily decomposed. The muriate is not seldom prescribed in mixtures which favour decomposition. Diacetylmorphine is decomposed by excess of alkali and by access of acid; not only by the fixed alkalies, but also by ammonia. When a solution containing free ammonia is left for a day or two a precipitate has formed which is insoluble in chloroform and gives the characteristic reactions of morphine. If a little of one of the salts is warmed with diluted hydrochloric acid the odour of acetic acid is quickly detected, and on precipitation of the base, it is found to consist largely of morphine. The same change takes place more slowly in the cold, wherefore it is manifest that this acetyl derivative ought not to be prescribed along with such things as carbonate of ammonium or dilute hydrochloric acid unless the prescriber desires an admixture of morphine.

Digalene, Soluble Digitoxin. — Cloetta. (*Apoth. Zeit.* **19**, 658.) This new digitalis glucoside is stated to have the same chemical constitution as digitoxin, but to differ from it in being amorphous and readily soluble in water. In consequence of this solubility, it acts more promptly than digitoxin. It is prepared in the form of a solution in glycerin 1, and water 3, which contains 0·3 Mgm. in each c.c., 5 per cent. of alcohol or 1 per cent. of acetone being added as a preservative; 1 c.c. of this solution is the physiological equivalent of 0·15 Gm. of dried digitalis leaves. It may be given either by hypodermic injection or by the mouth. It is claimed that the intolerance manifested in some cases towards digitoxin is not shown with digalene.

Dionine in Whooping Cough. A. G. Fjellander. (*Merck's Report*, **18**, 56.) Dionine is stated to be superior to all other drugs for the treatment of pertussis. It is given in aqueous solution with syrup of senega. Infants up to 6 months are given one teaspoonful of a mixture containing ⅙ gr. of dionine in 5 fl. oz.; with children of 2 years, ⅕ gr. in 3⅕ fl. oz; for 2 to 4 years, ⅖ gr. in the same volume; and above 4 years, 1½ gr. in 6½ fl. oz. The dose in each case is a teaspoonful. It has also been found useful in asthma, emphysema, acute catarrh, and other affections of the respiratory organs.

Emetine and Cephaeline Hydrochloride, Therapeutic Action of. P. Zepf. (*Archives internat. de Pharmacodynam. et de Therap.*, through *Merck's Report*, **18**, 61.) The hydrochlorides of both bases have a similar effect, but cephaeline is a more powerful emetic than emetine. They both stimulate the digestive tract. The appetite is never improved, but occasionally impaired by both alkaloids, and their internal administration has been found to cause general digestive disturbance, at the same time having a marked expectorant action. The general internal administration of ipecacuanha and its preparations for tuberculosis is condemned, and local applications, as in the form of inhalations or gargles, is recommended.

Enesol; Mercury Salicylarsenate. — Coignet. (*Lyon med.*, through *Répertoire* [3], **16**, 303.) Enesol is obtained by the interaction of a molecular weight of methylarsenic acid with one equivalent of basic mercuric salicylate. It forms a white amorphous salt soluble in water 1 : 25. Its aqueous solutions may be sterilized by heating with undergoing decomposition. It gives, unless the molecule be broken up, no reactions for arsenates or for mercury. Its toxicity is relatively slight. The dose which may be given to adults amounts to 2 grs. in 24 hours, and is administered in all cases where mercurial treatment is indicated, preferably by hypodermic injection, which is painless. For this purpose a 3 per cent. aqueous solution is employed, of which 2 c.c. is injected at a time. Twenty such injections may be made consecutively, when an interval of 10 days should be allowed before recommencing the treatment, if necessary.

Equisetum arvense as a Diuretic. A. Brietenstein. (*Therap. Monats.*, through *Merck's Report*, **18,** 209.) The popular reputation of this plant as a diuretic is well founded. In healthy persons the administration of a dialysate of the herb every 2 hours increased the excretion of urine by 30 per cent., and in a case of hepatic scirrhosis and dropsy, by as much as 80 per cent. This action is attributed to the large amount of silicic acid present. Schulze has directed attention to the powerful therapeutic action of silica, which points to its useful employment in medicine.

Erviop, a Pepper Adulterant. E. Collin. (*Journ. Pharm. Chim.* [6], **20,** 241.) Both black and white pepper, whole and ground, are adulterated on the Continent by admixture with a Leguminous seed, suitably tinted and coated, and given a fictitious acridity by means of capsicine or tincture of capsicum. Although readily detectable, the admixture is stated to be widely prevalent. A mere section of the whole fruit with a penknife is sufficient to detect the presence of the leguminous seeds, and the histological characters of the powder, as seen by the microscope, render the detection easy; the size and character of the starch grains alone, as well as other structural differences, being sufficient to distinguish the adulteration. The seeds employed resemble those of a *Pisum* or *Lathyrus*; but the process they undergo kills them, so that they cannot be grown for identification.

Ethylmorphine Hydrochloride. D. B. Dott. (*Pharm. Journ.* [4], **20,** 440.) This compound is believed by some to possess some special value of its own, although its therapeutic efficiency, like its pharmacological action, is probably almost identical with that of codeine. Professor Stockman considers the two compounds to be practically equivalent. Medical men have had the name "dionine" a good deal brought under their notice, but that name would not, of course, be applied to the official salt should it obtain a place in our Pharmacopœia. Ethyl-morphine differs entirely from the diacetyl compound in being a perfectly stable body. The hydrochloride melts at (or near) 124°C. The formula indicates two molecules of water, of which amount one-fourth is lost under 100°C., and the remainder at 120°C. This salt is soluble 1 part in 14 of water; 1 Gm. in 29 c.c. of alcohol, 90 per cent.

Eucalyptus Oils, Therapeutic Properties of. E. M. Holmes, (*Pharm. Journ.* [4], **19**, 80.) Attention has been frequently directed to the possibility that eucalyptol (cineol) is not the only constituent to which eucalyptus oils owe their therapeutic value. This opinion is founded on the fact that the oil first introduced, and that which is still preferred in Australia, is that of *E. amygdalina.* Phellandrene is a prominent constituent in this oil.

Experiments made with samples of various eucalyptus oils, prepared by Baker and Smith during their research on eucalyptus, show that phellandrene is one of the most important constituents, and that piperitone and aromadendral are also active bodies from a bactericidal and physiological point of view. These experiments have been undertaken in the physiological laboratory of the University of Sydney, under the supervision of Professor D. A. Walsh, by Mr. Cuthbert Hall, and are embodied in a pamphlet of thirty-eight pages, recently published at Parramatta. Hall points out that of the twenty-two distinct constituents that have hitherto been detected in various eucalyptus oils, cineol is the one to which the therapeutic value has been erroneously attributed.

Some of the constituents occur only in small quantity or only in one or two of the oils, and so far seem to have no special therapeutic value. Others are removed in the process of rectification, as they boil at low temperatures or they are of so irritating a quality that they could not well be administered medicinally. To the foregoing categories belong various alcohols, such as methyl, ethyl, isobutyl, and amyl alcohols and geraniol, the aldehydes citral and citronellal, cymene, geranyl acetate, amyl eudesmate, and valeric and acetic acid esters. Two of the aldehydes, butaldehyde and valeraldehyde, have an intensely irritating effect when inhaled. The other constituents, besides cineol, which may be considered most worthy of examination concerning their antiseptic and therapeutical effects are eudesmol, aromadendral, piperitone, and aromadendrene, dextropinene, lævopinene, and phellandrene.

For the bactericidal experiments two species were selected, *Staphylococcus pyogenes aureus* as the more resistant type, and *Bacillus coli communis* as a less resistant one. As a control, and to have a standard of comparison of his results with those of other observers, a 2½ per cent. solution of carbolic acid in water was used. In this solution the *Staphylococcus* was killed in five minutes and the *Bacillus* in half an hour.

The following table shows the relative bactericidal properties of the principal constituents :—

—	*Bacillus coli communis*		*Staphylococcus pyogenes aureus*	
	Hours	Minutes	Hours	Minutes
Aromadendral . . .	—	10	—	15
Piperitone	—	40	4	—
Eudesmol in 10 per cent. piperitone	—	30	—	—
Phellandrene	1½	—	2½	—
Dextropinene . . .	2½	—	4	—
Lævopinene	3	—	5½	—
Aromadendene . .	5	—	6	—
Cineol	8	—	2	—

Eudesmol, being insoluble in water and alkaline solution, was dissolved in piperitone or eucalyptol, and was found to increase the activity of these, but not to any marked extent. To the author's great surprise, pure cineol containing but a trace of pinene and ozone (prepared from *E. smithii*) was found to possess very feeble antiseptic properties, less than the other constituents. Further experiments showed that different specimens of cineol varied exceedingly in bactericidal power, and that the variation depended upon the quantity of ozone present in them. Experiments with the crude oils also showed great variation in bactericidal power, and this was determined to be due largely to the presence of acetic acid, aided to some extent by the iron and copper dissolved from the stills by the acid present in the oils. The crude oils of the following species were all markedly acid, *E. globulus*, *E. cneorifolia*, *E. smithii*, *E. cinerea*, *E. camphora*, *E. apiculata*, *E. macarthuri*, *E. punctata*, *E. eugenioides*, *E. odorata*, and *E. amygdalina*. On the other hand those of *E. citriodora*, *E. dives*, *E. dawsoni*, *E. hemiphloia*, *E. macrorhyncha*, *E. piperita*, and *E. dumosa* were either neutral or very faintly acid. When the acid is neutralized by soda solution without any other rectification a great difference is manifested. Thus, the crude oil of *E. smithii* destroys the *Staphylococcus* in thirty minutes, but after neutralizing it takes three and a half hours to destroy it. But for medicinal use the oils are always rendered neutral, so that the acetic acid may be left out of consideration so far as its bactericidal action in the rectified oils of commerce is concerned.

From the above table it is evident that apart from the presence of acid and ozone, oils containing aromadendral, like that of *E. hemiphloia*, may be considered the most powerful bactericides, but it is not certain whether they could be used medicinally.

Next in order come those containing piperitone, eudesmol, and phellandrene. Aromadendral, cineol, and piperitone only develop ozone in the very slightest degree, and then probably only because it is almost impossible to free them from traces of the terpenes.

Hall's experiments show that the ozone is due to the terpenes present in the oils. When phellandrene and aromadendrene are exposed to the air on a piece of paper they do not at first turn starch potassium iodide blue, but this reaction begins to appear after about twenty to thirty minutes, and the terpenes then resinify. Phellandrene and aromadendrene ozonize more quickly than dextropinene, and the latter more quickly than lævopinene. He accounts for the presence of varying amounts of ozone in cineol and rectified oils by the amount of exposure they have undergone to sunlight and to the varying amount of pinenes contained in the original oils. He points out that as ozone is not decomposed into oxygen until a temperature of 250–300°C. is reached, and cineol is often prepared by distilling off the portion boiling at 170–175°, most of the ozone would come over with the eucalyptol. Cineol readily parts with its ozone to water. Thus, if equal parts of cineol (containing ozone) be mixed with water, shaken for several minutes in a test-tube, and allowed to separate, the water, on testing with iodide of potassium and starch, gives as blue a coloration as the eucalyptol. The results obtained are evidently of considerable practical importance, and may be briefly summarized as follows :—(1) Cineol, except when acting as a carrier of ozone, is the weakest bactericide of all the constituents of the oils. (2) The ozone is the most important constituent. (3) The pinenes are the source of the ozone, and those which most readily ozonize are phellandrene and aromadendrene. (4) Cineol is therefore best prepared from oils containing these pinenes. (5) Rectified oils sold in commerce should be tested for the presence of ozone. (6) It is desirable that a test for the presence of ozone in cineol should be introduced into the Pharmacopœia. (7) It is open to question whether an oil containing phellandrene such as *E. odorata*, or one containing aromadendral, such as *E. cneorifolia*, or definitely ozonized oil, should not be substituted for one containing a uniform percentage of cineol and no phellandrene. (8) Piperitone seems likely to prove a valuable constituent, and is well worth further trial.

It is recommended that eucalyptus oil after rectification should be stored for at least two months in vessels, the mouths of which are closed with a plug of cotton wool, and that they should be shaken every day or two so as to expose a fresh layer of the oil to the influence of the atmosphere. The action of sunlight seems also to be important in the formation of the ozone.

The known action of eucalyptus in malaria and in contracting the spleen, obtained by the use of powdered eucalyptus leaves infusion and tincture, cannot be attributed to any known constituent. The difference in results when diabetic patients have been treated with an infusion of the leaves of *E. punctata* and *E. globulus* indicate that the substance which prevents the glycosuria exists in much larger quantity in the leaves of the latter species. The author is at present investigating this interesting subject.

Euporphine; Apomorphine Bromethylate. Bergell and Pschorr. (*Apoth. Zeit.*, **19**, 423.) The authors have shown that the emetic properties of apomorphine depend on the presence of the two phenolic OH groups which it contains, and that its dimethyl esters are no longer emetic. If, however, the tertiary base is converted into a quaternary one by fixing an alkyl radicle the physiological action is not suppressed, numerous such bodies being found to possess marked emetic action. Some of these derivatives promise to be of therapeutic value, notably apomorphine bromethylate, which, in conjunction with minute doses of morphine, has given excellent results in the treatment of chronic and acute bronchitis. The dose given has been $\frac{3}{20}$ to $\frac{1}{2}$ gr. It is more soluble than apomorphine, and since it exerts no action on the heart, it may be administered for a prolonged period without occasioning inconvenience.

Exodin. (*Merck's Report*, **18**, 67.) Diacetyl-rufigallic tetramethyl ester, chemically closely allied to emodin and pergatin, has been introduced into commerce under the name exodin. It is a yellow, odourless, tasteless powder, insoluble in water, sparingly soluble in alcohol; m.p. 180–190°C. It is given as an aperient in chronic constipation in doses of 8 grs., either suspended in water or in tablet form. Evacuation of the bowels generally follows in 8 to 12 hours after the dose, and is unaccompanied by pain or other unpleasant symptoms. [The name *exodin* should not be mistaken for *Exodyne*, one of the earlier analgesic mixtures. See *Year-Book*, **1892,** 231.]

Exodin. F. Zernik. (*Apoth. Zeit.*, **19,** 598.) Exodin is not, as claimed by the patentees, only the tetramethyl ester of diacetyl-rufigallic acid, but a mixture of hexamethyl ester of rufigallic acid, with pentamethyl ester of acetyl-rufigallic acid and tetra-methyl ester of diacetyl-rufigallic acid. Of these the hexamethyl ester alone is the purgative principle, the other two constituents being inert. By recrystallizing the residue of the chloroform extract of commercial exodin tablets from benzol, and saponifying the product in the cold with 5 per cent. alcoholic potash, this hexamethyl ester of rufigallic acid is left undecomposed. It crystallizes from acetic ether in yellow needles, $C_2 H_{20}O_8$, m.p. 245°C.; rufigallic acid tetramethyl ester, $C_{18}H_{16}O_8$, and rufigallic acid pentamethyl ester, $C_{19}H_{18}O_8$, are found in the mother liquor; the former crystallizing from acetic ether or chloroform in yellow prismatic leaflets, m.p. 235–237°C., the latter in yellow needles from acetic ether or hot alcohol, m.p. 192–194°C. Rufigallic acid tetra- and pentamethyl esters and their acetyl derivatives give Borntraeger's aloin reaction, but the hexamethyl ester does not.

False Yohimbi Bark. J. Herzog. (*Berichte Pharm.*, **15,** 4.) The false yohimbi bark, *Corynanthe macroceras*, contains but little of the physiologically active base yohimbine and larger quantities of totally inert closely allied alkaloids.

Feronia elephantum Gum. P. Lemeland. (*Journ. Pharm. Chim.* [6], **21,** 289.) This gum, known as "Wood apple gum," "Vilampishin" and "Kapithamapiscum," is met with in the Indian bazaars, where it is substituted for gum acacia; the close resemblance of the Tamil name "Vilampishin" to that of acacia gum, "velampishin," often serves as an excuse for the substitution. It occurs in various forms and sizes; the particular specimen examined was composed of pieces ranging in size from that of a pea to a pin's head, the average that of a grain of buckwheat. The colour is very variable; mostly the grains are colourless, but range in tint up to a reddish amber. The surface is shining and the fracture conchoidal. It contains 17·752 per cent. of moisture, 75·33 per cent. of gum soluble in water, and 6·9 per cent. of insoluble matter. Although Wiesner has stated that the mucilage is dextrorotatory, the specimen examined by the author was lævogyre, $[\alpha]_D - 6^\circ\ 41'$. Like acacia, it contains an indirect oxidizing ferment. On hydrolysis it yields 35·5 per cent. of pentoses and 42·66 per cent. of dextro-galactose. It resembles *Cochlospermum* gum in its composition.

Ferric Vanadate: Ferrozon. (*Merck's Report,* **18,** 12.) B. Rohden has introduced ferric vanadate into commerce under the name of Ferrozon. It forms a greyish-brown powder insoluble in water, but dissolved by acids. It is prescribed in the nervous affections resulting from anæmia, and in cases showing a tendency to tuberculosis, in doses of $\frac{1}{12}$ gr. every second day in the form of a pill.

Fibrolysin. (*Merck's Report,* **18,** 189.) Fibrolysin is a solution of thiosinamine with sodium salicylate which is claimed to afford painless injections which have the full therapeutic effect of thiosinamine alone. Since it does not keep when exposed to light and air, it is put on the market in vials containing a single dose of 2·3 c.c. of the solution, equivalent to 3 grs. of thiosinamine.

Filmaron. Jaquet. (*Merck's Report,* **18,** 73.) Filmaron is stated to be free from toxic action, and may be given to children in doses of 5 to 10 grs. Since it readily aggregates when in the powdered state, it should be dispensed in oily solution, preferably castor oil, a 10 per cent. solution in castor oil being supplied commercially for convenience in compounding, and known as filmaron oil.

Formane for Coryza. (*Bull. Gén. de Therapeut.,* **148,** 512.) Formane, a combination of formaldehyde and menthol, is stated to be a useful remedy for "cold in the head." The following inhalation may be prescribed. Menthol, 120 grs.; formalin, 75 grs.; oil of geranium, 10 drops. To be used frequently as a smelling bottle.

Formic Acid for Muscular Trembling. E. Clément. (*Comptes rend.*, **140**, 1198.) Continuing his researches on the therapeutic action of formic acid (*Year-Book*, **1904**, 213), the author has found it to give great relief in the treatment of two cases of hand trembling due to muscular atony. In each case the patient, before treatment, was unable to lift a glass of liquid with one hand without spilling half the contents. After two days' treatment with formic acid, however, both could drink with one hand with comfort, but the shaking had not absolutely disappeared after several days. The weakness in each case was of long duration, having existed for 10 or 18 years. The success attained suggests that possibly the same remedy might be useful for chorea.

Fucol not an Efficient Substitute for Cod-Liver Oil. G. Fendler. (*Apoth. Zeit.*, **20**, 542.) The claim put forward by Aufrecht (*Year-Book*, **1904**, 213) that fucol forms a complete substitute for cod-liver oil is denied. Fucol is found to contain only an infinitesimal trace of iodine, from 0·00005 to 0·0001 per cent., and very little extractive matter of *Fucus vesiculosus*, not more than 0·36 per cent., so that any physiological action it may exert must be attributed to the sesame oil of which it is virtually composed, and which was suggested many years ago as a substitute for cod-liver oil. Fucol has inferior emulsifying power to cod-liver oil; representing that at 100, the emulsifying figure for fucol is only 37·5.

Glycosol in Acute Rheumatism. C. Schober. (*Merck's Report*, **18**, 81.) Since glycosol is insoluble in the acid gastric juice, it possesses the great advantage over other salicylates of being non-irritant, while it is an extremely active anti-rheumatic. It gives excellent results in acute febrile rheumatism in doses of 30 grs. 3 to 4 times a day, and is also valuable in subacute and chronic rheumatism. It is devoid of any secondary reactions.

Golden Seal. (*Chem. and Drugg.*, **66**, 178.) In view of the increasing scarcity of *Hydrastis canadensis*, a pamphlet on the drug has been issued by the U.S. Department of Agriculture. The paper was undertaken to meet the demand for information about the plant. The greatest golden-seal producing States have been Ohio, Indiana, Kentucky, and West Virginia. Formerly the plant was so abundant in Ohio that it was considered a pest, but, owing to a steadily increasing shortage, to-day it is worth $1·50 per lb. in the wholesale market, and is eagerly hunted for by drug-plant collectors. This diminution of supply is of course due to the advance of civilization and increase in population, along with which came a growing demand for medicinal plants and a corresponding decrease in the sources of supply. In Ohio, especially, it gradually disappeared with the advance of the early settlers, as it will not thrive on cultivated land. The diggers also did their share towards exterminating this useful plant, which they collected regardless of the seasons. Prior to 1900 no one had ever attempted to cultivate golden seal for the market, but the scarcity has now led several growers in different parts of the country to undertake the cultivation on a commercial scale. The U.S. Department of Agriculture has carried on experiments at Washington, D.C., since the spring of 1899, and the results so far obtained, " while not as complete in some respects as would be desirable, seem to justify the conclusion that golden seal can be successfully cultivated." A full description of the best methods of cultivation is given. Golden seal grows easily in rich, loose garden soil. The plants are put in rows six inches apart, with a foot between the rows. It takes about three years from planting before harvesting, and after that an annual supply of roots should be had. In two seasons the original plants should increase four times by dividing the rhizomes, which can be cut up in the fall. The yield of roots from the small plot grown by the Department was at the rate of 5,120 lbs. per acre, which when dried yielded about 1,500 lbs. of marketable roots.

In times past the price of golden seal has fluctuated widely. High prices will cause the diggers to gather the root in abundance, thus overstocking the market, while the next season results in lower prices, at which diggers refuse to collect the root, thus again causing a shortage in the supply. The arrival of spring-dug root has a weakening effect on the market, although the fall-dug root is always preferred. For the past few years, however, high prices have been steadily maintained. It is impossible to ascertain the exact annual consumption of golden seal, but estimates furnished by dealers place these figures at from 200,000 lbs. to 300,000 lbs., about one-tenth of which is probably exported. It must not be forgotten, however, that if the plant was successfully cultivated on a large scale the point of overproduction would easily be reached.

Although golden seal is only one of the minor drugs on the

London market, the position of the drug created a considerable amount of interest here last year on account of the abovementioned causes, and even at the present time (January, 1905) it would be difficult to find five hundredweight in first-hands on offer. Its value has more than doubled during the past twelve months, and the demand has been correspondingly light.

Griserin. — Zernik. (*Apoth. Zeit.*, after *Journ. Pharm. Chim.* [6], **21,** 273.) This is a mixture of loretin (*Year-Book*, **1894,** 222) with sodium carbonate and bicarbonate, which has been introduced as an internal antiseptic for tuberculosis in doses of 3 to 7 grs. in cachets. Loretin, although somewhat neglected, is an excellent antiseptic.

Gurjun Balsam, Collection of, in Cochin China. (*Schimmel's Report, May*, **1905,** 48, after *Revue de la Droquerie.*) A deep incision at an angle of 45° is made in the tree in the spring with a wide cavity in which the collecting vessel is placed. A few hot coals are placed in the incision to start the flow of oil which then continues for about 6 months. That obtained during the dry season is considered to be the best. The average yield is 80 litres of balsam per tree ; but some trees give more than 200 litres. The colour varies from bright yellow to blackish brown, according to the species of *Dipterocarpus* tapped. It is much used locally as a waterproof varnish for boats. A white variety known as " shondrau " is exported in large quantities to China for the manufacture of lacquers. In France the balsam is finding considerable use in medicine as a substitute for Copaiba balsam, which it resembles in therapeutic action.

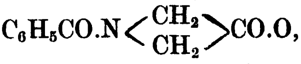
Hibiscus sabdariffa. E. M. Holmes. (*Pharm. Journ.* [4], **19,** 892.) The red succulent calyces of a variety of this Malvaceous plant occasionally appear in commerce.

The plant yielding the calyces is a small shrub, commonly cultivated in most tropical and sub-tropical regions. There are two forms of the plant, one with green stems and calyces, and the other with red stems and red calyces. The latter is more generally cultivated, as having the more acid calcyes of the two. In the West Indies this variety is known as the Rozelle, or red sorrel. Lunan, in *Hortus Jamaicensis*, I, p. 419, says : " They make agreeable tarts, and a decoction of them sweetened is commonly called sorrel cool drink, which is reckoned refrigerant and diuretic. In the Mexican Pharmacopœia an infusion of the drug is official as a refrigerant.

The acidity is due to the presence of tartaric acid, of which 9·9 per cent. was found to be present by Lyon, the remaining free acid, totalling 15 per cent., being malic acid. The calyces give of insoluble ash 3·88 per cent., of soluble ash 2·24, the alkalinity of the soluble ash, as potash, 0·75 per cent.

Besides the acid, there is the mucilage common to plants of the Malvaceæ. In the East Indies, therefore, it is found useful in dyspepsia, dysuria, and strangury.

Other parts of the plant are also useful. The root in doses of 2 drachms forms "an easy purge," according to Hernandez. In India the leaves are used in salads and curries, and the seeds as cattle food, whilst the stems yield a strong fibre known as Rozelle hemp.

Hippol. A. Nicolaicz. (*Apoth. Zeit.*, **20,** 23.) Under this name methylene-hippuric acid,  $C_6H_5CO.N\left\langle\begin{matrix}CH_2\\CH_2\end{matrix}\right\rangle CO.O$, has been introduced as a remedy in infectious diseases of the genito-urinary organs. It occurs in white, odourless and tasteless crystals, m.p. about 151°C., sparingly soluble in water to the extent of 1 : 460 at 23°C. ; this aqueous solution is neutral. It liberates formaldehyde in the presence of alkalies, ammonia, and alkali carbonates. The dose prescribed is 90 grs. in 24 hours. It is an active bactericide.

Hirudin. A. Bodong. (*Chem. Centralblat*, **76,** 620, after *Archiv für exp. Path.*) The yield and activity of hirudin from *Hirudo medicinalis* is very variable in quantity and activity. The yield from starved leeches is very small ; autumn leeches give the best product, spring leeches the worst. The horse leech does not form any hirudin. The leeches' heads are crushed with sand and extracted with salt and water or with distilled water.

Ichthyol for Scarlet Fever. M. S. Nasarow. (*Merck's Report*, **18,** 100.) Ichthyol, in capsules or in solution of ichthyol 3, water 1, given internally, is stated to cut short the course of the disease, to eliminate complications, and to lessen the power of infection. Of the aqueous mixture the dose for children 12 to 8 years of age is 35 ♏ three times daily; from 8 to 10, 25 ♏; from 5 to 8, 15 to 20 ♏. Adults may take 50 to 60 ♏.

Indoform. (*Pharm. Centralh.*, **46,** 316.) This is a white powder, m.p. 108–109°C., obtained by the action of formaldehyde on acetylsalicylic acid. It is sparingly soluble in cold water and has an acid, astringent taste. It is decomposed in the alkaline secretion of the intestines first into methylene glycol, which is slowly split up, yielding formaldehyde. It has been given for gout, rheumatism and neuralgia in doses of 7½ to 22 grs. in the form of tablets, each containing 7½ grs., which are taken in water during or after a meal.

Iothion. G. Wesemberg. (*Therap. Monats.*, through *Apoth. Zeit.*, **20,** 199.) Hydroxypropane di-iodide, under the name of iothion, has been employed for the percutaneous administration of iodine. It occurs as a yellowish oily liquid, sp. gr. 2·4 to 2·5. It is sparingly soluble in water, but readily dissolved by fatty bodies. It is very stable in neutral aqueous solution, but the presence of even a trace of alkali causes saponification. With some individuals, the application of undiluted iothion occasions a slight burning, but this is not noticeable when it is diluted with oil or lanoline. Iothion may be applied for a prolonged period without disturbing the digestion. (See also *Year-Book*, **1904**, 223.)

Ipecacuanha Root substituted by Heteropteris pauciflora Root. C. Mannich and W. Brandt. (*Berichte Pharm.*, **14,** 297.) The root of *Heteropteris pauciflora*, which has some resemblance in appearance to true ipecacuanha, has been met with as a substitute for that drug. Since the root contains no alkaloid, starch, nor calcium oxalate crystals, the fraud is readily detected; the microscopical structure of the root is also quite different, since it contains cells secreting a special brown colouring matter which turns black with Fe_2Cl_6. It contains a lævorotatory carbohydrate, $[\alpha]_D$ −40° 98′, which has no reducing action on Fehling's solution before hydrolysis, but which then furnishes levulose. This has been named hepteropterin, and has the formula $C_6H_{10}O_5 + \frac{1}{6}H_2O$. It is closely allied to inulin and graminin.

Isoform. A. Liebrecht. (*Pharm. Zeit.*, **49,** 842.) Isoform, $C_6H_4.OCH_3.IO_3$, is an oxidation product of para-iodo-anisol occurring in brilliant white scales sparingly soluble in cold water, decomposing at 225°C. It is stated to be a powerful antiseptic, which may be usefully employed as a dressing for wounds and as an iodoform substitute. It is not used undiluted. The following preparations are suggested. *Isoform dusting powder*, equal parts of isoform and calcium phosphate. *Isoform paste*, equal parts of glycerin and isoform. *Isoform gauze*, 1, 3, and 10 per cent., prepared with the powder. *Isoform capsules* are also prepared. Isoform may be readily determined in mixtures or gauze by treating a known quantity with KI solution, then adding acetic acid ; iodine is liberated, and is titrated in the usual manner with N/10 thiosulphate solution, 1 c.c. of which under these conditions equals 0·00665 Gm. of isoform.

Isophysostigmine. — Ogui. (*Apoth. Zeit.*, **19**, 891.) E. Merck has shown that when the liberated alkaloids of Calabar bean are shaken out with ether, physostigmine is dissolved, but another base, isophysostigmine, which has the same empirical formula, remains insoluble. The author has examined this base, and finds that its sulphate melts at 202°C., while physostigmine sulphate has the m.p. 140–142. It also gives a crystalline platinochloride, whereas physostigmine gives none. Iodine produces an immediate precipitate with 1 per mille solutions of physostigmine sulphate, but the same salt of isophysostigmine gives no precipitate even in 1 per cent. solutions. The point of difference of the greatest practical importance is observed in the physiological action ; salts of isophysostigmine have a more rapid, more powerful, and more lasting effect than those of physostigmine, the relative value being as 3 : 4. On the other hand, atropine more readily counteracts the effects of isophysostigmine than those of physostigmine. Solutions of isophysostigmine intended for therapeutic use should be prepared and stored with the same precautions as those of physostigmine ; if they are to be kept, this should be done in amber-coloured bottles, and the solutions should be preserved with boric acid.

Isopral. F. Zernik. (*Apoth. Zeit.*, **20**, 300.) Trichlorisopropyl alcohol has been introduced as a hypnotic, with the claim that it is twice as active as chloral when given in doses of 12 to 15 grs. This dose is generally ample, but, if necessary, as much as 45 grs, may be given without harm, The hypnotic action ensues about 15 to 30 minutes after the administration of the dose. Isopral occurs in transparent prisms, m.p. 49°C., with a camphoraceous odour. Its solubilities are: in water at 15°C. 1 : 50, at 19°C. 3 : 100; more soluble in alcohol, ether and fats. The aqueous solution is neutral; its taste is sharp, then burning, followed by a brief anæsthetic action on the tongue. When heated with H_2SO_4 containing 1 per cent. of β-naphthol, it gives a yellowish brown solution with a strong fluorescence. Under like conditions, resorcin gives a deep-brown liquid, but only a slight fluorescence. Alkalies decompose isopral slowly in the cold, evolving gas and forming resinous decomposition products; at 40°C. the reaction is more marked, and an aldehyde is formed, together with chloride, and a formate of the alkali. Isopral is a powerful reducing agent. It gives iodoform when warmed with solution of KI and I.

Jaborandi Leaves of Commerce. E. M. Holmes. (*Pharm. Journ.* [4], **19,** 891.) For some years past there has been great difficulty in obtaining the jaborandi leaves official in the Pharmacopœia, so that it has not been possible for more than a few of the wholesale houses to procure a supply. This scarcity doubtless arose from the fact that, when last imported in quantity, there was on the market at the same time a considerable quantity of the leaves of the Rio and Maranham jaborandis, and that these being cheaper were largely purchased in preference, the former for galenical purposes and the latter chiefly for the preparation of the alkaloid in Germany. In consequence, the genuine leaves, after adding to the expenses of the importer by warehousing, had to be sold at a loss, and subsequently, as might be expected, shippers were shy of exporting more. But the fact remains that although the price of genuine leaves has now risen to a figure which should well repay the exporter, it is practically impossible to procure them in any quantity at present, whilst there is no difficulty in obtaining the Rio and Maranham kinds.

Under these circumstances it seems desirable to inquire whether these leaves might be substituted officially for those now recognized. There is no doubt that the leaves of *P. microphyllus* (Maranham jaborandi) usually come into the market in good condition, whilst those of *P. pennatifolius* (Rio jaborandi) vary much, being often badly preserved and of inferior quality. As regards their alkaloidal contents, the following were the records up to 1895:—*Pilocarpus jaborandi,* 0·5 to 0·8 per cent. pilocarpine nitrate ; *P. pennatifolius*, 0·18, 0·19, and 0·3 per cent. ; *P. microphyllus*, 0·16, 0·19, and 0·8 per cent.

Since that date the alkaloids of jaborandi have been carefully examined by Jowett, with the result that commerical pilocarpine is often found to contain isopilocarpine, and that the leaves of *Pilocarpus jaborandi* contain besides these two alkaloïds a small quantity of pilocarpidine, which is practically inert.

Paul and Cownley reported that the leaves of *P. microphyllus* yielded 0·84 per cent. of a crystalline nitrate, but this appeared to consist of two nitrates, one of which had a higher melting-point than the other. The one with the higher melting, regarded in the light of Jowett's researches, is apparently isopilocarpine nitrate, that salt having a m.p. of 159°, as against the corresponding one of pilocarpine, which melts at 146°. Jowett has informed the author that the amount of isopilocarpine in both the *P. jaborandi* and the *P. microphyllus* leaves is practically the same, viz. about 10 per cent. of the alkaloidal contents, so that the leaves of these two differ only in the presence of the inactive pilocarpidine in the one and not in the other. Petit, however, states that the leaves of *P. microphyllus* contain pilocarpidine to the extent of $\frac{1}{10}$th of the alkaloid present, as well as 0·6 to 0·8 per cent. of pilocarpine nitrate. With respect to the Rio jaborandi, the late J. Williams informed the author that only half as much alkaloid could be obtained from them as the Pernambuco kind yielded, and for this reason, as well as that the leaves of *P. pennatifolius* are often of bad quality, and that they are not easily recognized by the unpractised eye, whilst those of *P. microphyllus* are very easily recognized, it seems that the latter are more suitable as a substitute for the official drug. Dr. H. H. Rusby states that where a tincture of the Maranham jaborandi has been tried it is preferred by prescribers in the United States to that of the official kind. Further, it is probable that the leaves of *P. microphyllus* will be made official in the next U.S. Pharmacopœia and in the new French Codex. The subject is, therefore, well worth consideration in this country.

Kava-kava Resin, Antiseptic Action of. — Marpmann, (*Zeits. für angew Mikros.*, through *Pharm. Centralh.*, **46**, **264**.) Experiments show that kava-kava resin has a marked bactericidal action on the micro-organisms of the urine, and that *Gonococcus* is more susceptible to its influence than other bacteria. No fresh growth of this coccus was obtained after treating cultivations of it with a 1 per cent. solution of kava-kava pastilles. Cultures of *gonococci* and urine bacteria were completely sterilized in 4 hours by a 1 per cent. solution, in 1 hour with a 2 per cent. solution, and in 7 minutes with a 3 per cent. solution. The administration of kava-kava resin to healthy and morbid subjects gave confirmatory results.

Linum catharticum, Physiological Action of. J. S. Hills. (*Pharm. Journ.* [4], **20,** 401.) In the course of the investigation of the nature and properties of linin (p. 107) that body was found not to be the active principle of the plant. The infusion and the alcoholic extract of the drug were found to be very strongly aperient; but the decoction, the *evaporated* infusion, the hydrolized alcoholic extract, and linin itself are inactive. It would seem, therefore, that the active substance existing in the drug is destroyed by hydrolysis, and that simultaneously linin makes its appearance. Moreover, comparative experiments with the varnish-like residue before and after treatment with hydrochloric acid show that hydrolysis is always accompanied by the production of sugar, which reduces Fehling's solution, and from which the osazone (m.p. about 205°) has been prepared. The purgative principle, therefore, may be a glucoside, but all attempts to isolate it have been unsuccessful.

Lycopodium, Powdered Amber as Adulterant of. L. van Italie. (*Pharm. Weekblad.*, through *Chem. Centralblat.*, **76,** 110.) Very finely powdered amber, tinted with a coal-tar colour, is stated to be employed as an adulterant of lycopodium.

Magnesium Peroxide for Diarrhoea. — Bertherand and — R. Gaultier. (*Journ. Pharm. Chim.* [6], **20,** 47.) Magnesium peroxide, administered in doses of 8 to 16 grs. per diem in the form of keratin coated pills, so that they traverse the stomach without disintegration, is stated to be an efficient remedy for the treatment of diarrhœa of adults due to acid fermentation. The nascent oxygen and hydrogen peroxide thus liberated in the intestines have a powerful disinfecting action.

Medicinal Plants of German East Africa. W. Busse. (*Berichte Pharm.*, **14,** 187.) *Coffea arabica*, var. *stuhlmanii*, is employed in the colony; two other species, *C. sanguebariæ* and *C. schumannina*, occur wild, but are not used. *Amomum mala* is very widespread, and its scarlet fruits are much sought after by the natives, who, after opening the hard envelope, consume the interior pulp, taking care not to crush with the teeth the seeds, which are rich in aromatic principles. In times of scarcity the fruits of *Dialopsis africana* and the tubercles of a species of *Cyanastrum* are eaten, but since they are poisonous in the raw state, they are first prepared before being consumed. Under similar conditions, the fruits of *Flagellaria indica*, the seeds of a *Mucuna* and the tubercles of a *Gloriosa* are occasionally used. The genus *Strychnos* is very strongly represented in the flora of the colony, no less than 20 species, 14 of which are new to science, having been recorded. They differ extremely in general characters, as for instance in the size of the fruit; in some plants this is as small as a pea, in others as large as a child's head. Some of the genus have edible fruits; these are *Strychnos quaqua, S. leiocarpa, S. suberifera, S. behrensiana, S. goetzii, S. radiosperma, S. melonicarpa, S. cardiophylla*, and *S. harmsii*. Among those which possess poisonous fruits or seeds are *S. pungens, S. engleri, S. euryphylla*, and *S. omphalocarpa*. *Strychnos cardiophylla* and *S. procera* are employed by the natives as drugs. Thoms has examined the latter and has isolated strychnine and brucine from the bark, but none from the leaves, which however have a bitter taste. *Erythroplœum guiniense* occurs, and the wood is used for veneering; it is known over oriental Africa as "muavi"; but the term has no specific meaning, being applied to all trees having a poisonous bark which is used for ordeal purposes. Thus *Parkia bussei* and *Stuhlmannia moavi* are both known as "muavi." A toxic *Indigofera, I. garckeana*, occurs. Among the poisonous *Apocynaceæ, Strophanthus kombé, S. eminii*, and *Acokanthera abyssinica* are enumerated. *Dregia rubicunda*, N. O. Asclepiadaceæ, yields poisonous seeds. Two leguminous plants, *Tephrosia vogelii* and *Dolichos pseudopachyrrhizus*, are used as fish poisons. Among the barks rich in tannin the following have been identified: *Rhizophora mucronata, Bruguiera gymnorhiza, Ceriops cadolleana*, and *Xylocarpus granatum*. Among the gum-producing trees, *Acacia verek, A. kirkii, A. seyal, A. spirocarpa, A. arabica, A. stenocarpa, A. usambarensis, A. stuhlmanii*, and *A. verugea* are recorded, while *Berlinia enimii* yields a kind of tragacanth, which from its colour and astringency approaches kino in character. True kinos are produced in the colony by *Pterocarpus bussei* and *Derris stuhlmannii*. A Guttifer, *Haronga thaniculata*, yields a yellow latex which, when dry, has all the properties of gamboge; two species of gum-yielding *Garciniæ*, *G. livingstonei* and *G. bussei* are found in the south of the colony. Fats may be obtained from *Allanblackia stuhlmannii*, *Telfairia pedata* and *Trichilia emetica.* Fragrant essential oils and products may be obtainable from many plants. Numerous species of the genus *Ocimum* occur, notably *O. canum.* Among the plants affording a heliotrope odour are *Plectronia heliotropiodora*, N. O. *Rubiaceæ*, *Clausina anisata*, N. O. *Rutaceæ*; and *Eupatorium africanum* develops when dried a very powerful odour of coumarin. Two Labiates, of undetermined species, yield eugenol.

Menthyl Valerianate for Sea-sickness. K. Koepke. (*Therap. Monats.*, **18,** 296.) Menthyl valerianate, in doses of 10 to 15 drops on sugar, is stated to be an excellent preventative against sea-sickness, and to ward off an attack if taken in the early stages.

Mesotan, Precautions in Prescribing and Dispensing. L. Weil. (*Merck's Report,* **18,** 124.) Mesotan should never be applied to the skin undiluted; the most suitable application is a mixture with equal parts of olive oil. Two or three drachms of this should be applied very gently, preferably with a brush. As soon as the spot treated shows any reddening the application should be intermitted for a few days. Impervious bandages should never be placed over mesotan applications. Since mesotan is readily decomposed by moisture, it should be kept in well-stoppered bottles. If these precautions are observed, applications of mesotan will not give rise to irritation.

Metallic "Ferments" and Colloidal Metals for Pneumonia. A. Robin, also — Barbier. (*Journ. Pharm. Chim.* [6], **21,** 125.) Injection of 10 c.c. of solution of metallic ferments produces a prompt effect on the course of the disease in pneumonia, and a speedy convalescence results. In other infectious diseases the results are very variable; good results have followed its employment in broncho-pneumonia, but in typhoid and in meningitis its effect is less marked and less durable. In acute articular rheumatism the injection of 10 c.c. of solution of gold or palladium is without much effect on the local affection, but the general condition of the patient is improved. When sodium salicylate is given as well, a marked relief of pain is followed by rapid convalescence. In infants, doses of 5 c.c. of colloidal gold, platinum and silver have given excellent results in pneumonia, but in digestive intoxication, and in diphtheria, the results obtained have been uncertain.

Mustard Seeds, Commercial. C. Hartwich and A. Vuillemin. (*Apoth. Zeit.*, **20**, 162, 175, 199.) The authors have made an exhaustive study of the various mustard seeds met with in commerce. Although *Brassica nigra*, *B. juncea*, and *Sinapis alba* are the chief sources of mustard seeds used in European pharmacy, other varieties are met with in commerce. Seeds of *Brassica rapa* are found mixed with other seeds; with *Brassica nigra* in Italian and German brown mustard, with *Sinapis arvensis* in Russian and Roumanian brown mustard, with *B. juncea* in Sarepta mustard, and with *B. nigra* and *S. arvensis* in Puglia black mustard. *Brassica napus*, mixed with *B. juncea* and *B. nigra*, forms Indian brown mustard. *Sinapis glauca* is found in commerce as " white Indian mustard," " yellow rape seed," " Guzerat rape," " Sommeani rape," and a Java variety as " Sada rape." *Sinapis cernua* is official in Japan, and constitutes Japanese and Chinese mustard. *Sinapis dichotoma* is found in Indian mustards, the variety known as " brown Indian rape," and mixed with *S. glauca*, as " Cawnpore rape." *Brassica nigra* alone comprises Turkish, Dutch, Sicilian, and Italian brown mustard; mixed with *B. rapa* it occurs in second quality Italian and in German brown mustard; with *B. rapa* and *S. arvensis* in Puglia black mustard; with *B. juncea* in Bombay mustard; with *B. juncea* and *B. napus* in Indian brown mustard. *Brassica juncea* forms an important part of the mustard of trade, and next to *B. nigra* is most widely cultivated. It occurs in two varieties, yellow and brown, and is known as " Sarepta " mustard. When ground it forms a very bright-coloured yellow powder, especially when deprived of its seed coats. The bulk comes into commerce as Russian mustard; it also forms Bombay mustard of first grade, and mixed with *B. rapa* second grade Bombay; and occurs with *B. nigra* and *B. napus* in Indian mustard. *Sinapis alba* forms German, Dutch, Russian, Argentine and English white mustard. *Sinapis dissecta* is found in commerce as " Gardal mustard "; it is indigenous to Southern Europe and cultivated in Russia. *Sinapis arvensis* alone is found as second grade brown mustard, also when mixed with *B. rapa*; and with *B. rapa* and *B. nigra*, in Puglia black mustard. As it contains but little trace of essential oil, it is of small value. *Eruca sativa* alone comprises Persian mustard. Detailed descriptions of the macro- and microscopic characters of each of these is given, also a list of 104 seeds of different species of plants found as admixtures or adulterants, among the most objectionable of which *Agrostemma githago*, *Conium maculatum*, *Hyoscyamus niger*, *Nigella arvensis*, *N. orientalis*, and *Ricinus communis* may be noted. A table is given, showing the average size and weight of the seeds of 36 commercial varieties of seeds, with the amount of essential and fixed oil found in each. Gardal mustard, from *Sinapis dissecta*, gave the lowest yield of volatile oil, only 0·06 per cent. ; Turkish brown mustard, from *Brassica nigra*, the highest yield, 1·17 to 1·18 per cent.

The essential oil was determined as follows. Five Gm. of the seeds rubbed to fine powder is macerated in a 200 c.c. round-bottom flask with 100 c.c. of water, with frequent agitation at 20–25° C. for an hour. Twenty c.c of alcohol is then added, and the flask attached to a condenser, to which an Erlenmeyer flask containing 30 c.c. of solution of ammonia and 10 c.c. of alcohol is fitted as a receiver, so that the delivery tube of the condenser dips below the surface of the liquid. This receiver is connected with a second similar flask, also containing ammonia and alcohol, to prevent any loss. Distillation is carried on until half the liquid has distilled over. The condenser is then disconnected and washed out with a little water, and the washings bulked with the distillate ; to this 4 c.c. of 10 per cent. $AgNO_3$ is added, and the whole warmed on the water-bath to aggregate the Ag_2S formed. This is then collected, dried and weighed ; the weight obtained × 8·602 gives the percentage of essential oil in the seed. The fatty oil is determined in the usual manner by extraction with ether in Soxhlet's apparatus. The lowest yield was 21·42 per cent., from Thuringian brown mustard, *Sinapis arvensis* ; the highest 46·1, from Javan " Sada sarsapa," *Sinapis glauca*.

The original paper should be referred to for detailed anatomical characters of the various seeds.

Naphthol Camphor a Dangerous Drug. E. Rochard. (*Bull. gén. de Therap.*, **148,** 725.) In consequence of several fatal accidents having followed the hypodermic injection of naphthol camphor in the course of French medical practice, its abandonment as a drug is strongly urged by the author, supported by Guinard. Baylac has shown that it is markedly more toxic than camphorated alcohol, camphorated oil, or simple naphtholated alcohol when administered singly. The toxic effects have supervened within a few minutes of the administration of the dose, assuming the form of epileptic convulsions, which, in some cases, have terminated in death by asphyxia. The consensus of opinion is that naphthol camphor, possessing a marked toxicity of its own, is a dangerous drug, which should not be prescribed.

Opium, German. H. Thoms. (*Apoth. Zeit.*, **19,** 773.) One hundred poppy capsules grown in Germany from the white seeded variety of *Papaver somniferum,* yielded 1·27 Gm. of " air dry " opium. When completely dried this gave 6·7 per cent. of morphine, 8·4 per cent. of crude narcotine, and 0·3 per cent. of crude codeine. The cultivation of an experimental crop of the dark seed variety of *Papaver somniferum* is contemplated.

Opium, Persian. J. Schindelmeiser. (*Apoth. Zeit.*, **1904, 19,** 836.) Three specimens of Mesched opium have been examined, four of Ispahan opium, and a specimen of tschakida, a so-called cooked or prepared opium, which is employed for eating or smoking, and mixed with hemp. *Mesched opium* occurs in greyish-brown shining sticks, wrapped in paper. It contains from 10 to 12 per cent. of moisture and from 5·9 to 8·71 per cent. of morphine, calculated on the dry material. No starch could be detected by the microscope. *Ispahan opium* also occurs in paper-wrapped shining sticks, which are brown in colour. It is softer than Mesched opium, and contains 18 per cent. of moisture. The dry material gave from 11·9 to 19·05 per cent. of morphine. This opium was also free from starch. *Tschakida,* or *prepared opium,* is in cakes weighing about 60 Gm. : it is dark brown, almost black, in colour, and appears to be oiled. It contains 22 per cent. of moisture and only 0·38 per cent. of morphine. The practice of adulterating opium with inspissated fruit juices, such as peach and apricot juice, is said to be wide-spread in the Caucasus. Two such specimens of *Caucasian opium* are met with, which contained only 1·58 and 1·74 per cent. of morphine.

Opium, Smyrna, " Manipulated." V. Masson. (*Journ. Pharm. Chim.* [6], **21,** 529.) The general acceptance of a standard of 10 per cent. of morphine for commercial Smyrna opium has not proved an unmixed advantage, since there are now to be met with in commerce numerous grades of the drug, which although containing a fairly close approximation to that amount of morphine, differ widely from the unsophisticated opium in the ratio of water and soluble extractive, so that galenical preparations, and especially extract of opium, prepared from them, differ widely from those obtained with the natural article. One such sample offered as natural Smyrna opium, occurring in uniform small spherical cakes, composed of a greyish, earthy, firm, homogeneous mixture, yielded 14·5 per cent. of moisture, 10·2 per cent. of morphine, calculated on the dry opium, and only 20 per cent. of extract calculated on the opium containing 10 per cent. of moisture. Moreover this extract only contained 5·9 per cent. of morphine ; whereas with normal opium it would, with this small amount of extractive, have amounted to about 35 per cent. The " exhausted " marc was found to retain no less than 5·32 per cent. of that alkaloid. The opium was alkaline in reaction, instead of showing the normal acidity. On incineration, it gave 23·2 per cent. of ash consisting of carbonates, silica, and argillaceous earth. The opium was evidently compounded either with natural opium rich in morphine, and earthy matter, or with a mixture of inorganic matter and opium marc, brought up to the required morphine standard by direct addition of alkaloid.

Two other samples, occurring in regular spherical cakes, slightly larger than the above, of a firm granular consistence, were found mixed with natural opium. The one, slightly alkaline in reaction, gave 13 per cent. of morphine, 20·2 per cent. of extract, and 9·24 per cent. of moisture ; the other, slightly acid, contained 12·19 per cent. of morphine, 27·8 per cent. of extract, and 8·31 per cent. of moisture. The marc of both was composed of the elements of natural opium. Both are notable for the low yield of extract.

A fourth sample, sold as " manipulated " opium without guarantee as to the extract content, standardized to 10 per cent. of morphine, occurred in small soft cakes each wrapped in a poppy leaf. The consistence was soft, the mass having a dark colour and a homogeneous pilular consistence with a fine grain. It contained 10·66 per cent. of morphine and 44·52 per cent. of extract, a normal amount. The reaction was acid.

The fifth sample, guaranteed to contain 45 per cent. of extract and 10 per cent. of morphine, sold as " special opium for extract," gave 10·12 per cent. of morphine and 57·3 per cent. of extract ;

but this extract only yielded 12 per cent. of morphine; it contained no less than 21·5 per cent. of gum; it presented a peculiar appearance, having a gummy and elastic consistence, and was of a deep chestnut colour. The gum isolated therefrom was viscous, precipitated by alcohol, and without action on polarized light. It was readily hydrolized.

Concurrently with the above experiments natural unsophisticated opiums were examined. All these were acid in reaction, and gave the following results. *Yerli opium:* moisture, 26·1; extract, 53·95; morphine, 13·51 per cent. *Salonica opium:* moisture, 24·97 and 17·62; extract, 49·17 and 46·35 per cent.; morphine, 12·18 and 10·53 per cent. *Smyrna opium:* moisture, 20·93; extract, 44·3; morphine, 10·82 per cent. The extracts from these contained a mean of 26 per cent. of morphine.

Orchil. P. S. Ronceray. (*Pharm. Journ.* [4], **19**, 734.) The name "orseille" is given in France to those lichens which, on exposure to air and ammonia develop a purplish-red colour. The use of orseille was introduced into Europe from the East by a Florentine named Federigo about A.D. 1300. From his successors, who were named Orcellari, Ruccellari, and Ruccellai, the name of one of the chief genera of lichens used, viz. *Roccella*, is apparently derived In France two commercial groups of orseille are recognized viz. the "orseille de terre" and the "orseille de mer," the former being collected inland in hilly districts, and the latter on the sea-coast. The former includes the orseille of the Pyrenees, Alps, and Cevennes, obtained from *Pertusaria dealbata*, and the "orseille d'Auvergne," of which *Lecanora parella*, Ach., is the source. The "orseille de Suède" is obtained from *Lecanora tartarea*, and the "orseille de Norvège" from various species of *Umbilicaria* or *Gyrophora*, especially *U. pustulata*, D.C. Of those obtained on the sea-coast, *Roccella tinctoria*, D.C., yields the orseille of the Canaries, Madeira, Teneriffe, Cape Verd, and Mogador, that of the last-named being often mixed with *Ramalina scopulorum*, Ach. *Roccella portentosa*, Mtg., affords the large orseille of Valparaiso and Manilla, and *R. phycopsis*, mixed with some *R. tinctoria*, that of Sardinia.

The chief botanical sources of the orseille at present used are *Roccella montagnei*, which comes from Mozambique, Madagascar, and Angola; and *Dendrographa leucophæa*, Darb., which is imported from California. Occasionally under the name of "orseille des Colonies," *Usnea plicata*, Fr., and *U. angulata*, Ach., are offered in the French markets. *Lecanora glaucoma*, Hoffm., and *Evernia prunastri*, L., are also sources of orseille. Erythrin is the chief constituent of *Roccella montagnei* and *Dendrographa leucophœa*, lecanoric acid of *Roccella tinctoria*, and orcin of *Pertusaria dealbata*. Orcin, however, occurs also in the three species first mentioned, although its presence appears to have been overlooked in them by previous observers. It can be detected *in situ* by the sulphovanillic reagent, made by mixing one part of concentrated H_2SO_4 with one of water and adding vanillin in excess, i.e. until none remains undissolved. Made in these proportions it reddens orcin, but not erythrin, nor lecanorin; made stronger with sulphuric acid it reddens the others also.

The presence of other " chromogenous ethers " is ascertained by soaking the lichen in water acidulated with one-fifth of HCl for half an hour, to remove calcium oxalates, and then, after washing with distilled water, taking a section and treating it with solution of 1 part of calcium hypochlorite in 40 parts of water under the microscope, when a red coloration indicates their presence. These chromogenous ethers are soluble in methyl and ethyl alcohols, in acetone, boiling water, and solutions of NaOH and AmOH. The distribution of these substances can also be determined in lichens deprived of oxalates by examination of microscopic sections, in which the crystals can be seen by aid of a polarizer, since they are insoluble in the dilute HCl. They are usually found in crystals outside the hyphæ, but their distribution varies with the different lichens. In *Roccella tinctoria* the cortex and centre are free from lecanoric acid, which is present in quantity in the gonidial portion, as well as in the soredia, and on the external part of the apothecia and the tips of the paraphyses, but never in the asci nor in the central layer (Moeller). In *R. portentosa*, on the contrary, lecanoric acid is abundant in the cortex, and occurs in the central layer, but there is very little in the gonidial layer and none in the soredia. In *Roccella montagnei* erythrin is abundant in the cortex and interhyphic spaces, and it occurs also in the gonidial layer and near the cortex, and between the apices of the paraphyses, but not in the asci nor below them, nor in the medullary layer, the spermogones, or soredia.

In *Dendrographa leucophœa* erythrin is abundant in the cortex, and in the subcortical portion of the gonidial layer and in the soredia, but not in the medullary layer nor in the thalamium or epithecium, although it is present in the apices of the paraphyses. In *Pertusaria dealbata* erythrin is found throughout the thallus, especially in the cortex. In *Usnea dasypoga*, Fr., var. *plicata*, Fr., usnic acid is absent from the cortex and central axis, but occurs in the lacunose zone and in the gonidial layer. The distribution is similar in *Usnea angulata*. In *Umbilicaria pustulata*, gyrophoric acid is present in abundance in the medulla below the gonidial layer, but not in the cortex and not in the apothecium, although present in its pedicel. In *Lecanora tartarea*, gyrophoric acid occurs everywhere in the thallus, but to render it evident, lecanoric acid has to be first dissolved out by alcohol, in which the gyrophoric acid is very sparingly soluble. In *Lecanora parella*, parellic acid occurs throughout the thallus, but is most plentiful in the cortex. In *Usnea* and *Umbilicaria* it is generally difficult to moisten the section with the reagent, but if first wetted with alcohol it takes up the acid reagent much more readily. The lichens *R. montagnei*, *R. tinctoria*, and *Dendrographa leucophœa* contain a diastase, without which the purple colour is not developed. The lichens do not contain either an oxydase or an anaer-oxydase. The use of urine is not necessary in the manufacture, since ammonia is the active ingredient in it; but ammonia, in the absence of the diastase, cannot develop the colouring matter.

Passiflora incarnata as a Sedative. W. S. Stapleton. (*Apoth. Zeit.*, **19,** 931.) Tincture of *Passiflora incarnata*, in doses of 20 to 25 ♏ every 3 hours, is a useful remedy in insomnia from hysteria, neurasthenia, neuralgia, and other nervous affections. It does not act as a narcotic, but as a nervine sedative, and is stated to have no bad after effects.

Perhydrol. F. Zernik. (*Berichte Pharm.*, **51,** 6, and *Merck's Report*, **18,** 146.) This name has been given to a concentrated 30 per cent. solution of H_2O_2, which liberates 100 volumes of oxygen. Whereas ordinary commercial hydrogen peroxide generally contains free acid, and is unstable, perhydrol is perfectly neutral and stable. It is prepared by adding Na_2O_2 to a 20 per cent. solution of H_2SO_4 immersed in a freezing mixture; a greater part of the Na_2SO_4 formed crystallizes out, the rest is removed by distilling the solution under reduced pressure.

The importance of employing pure neutral hydrogen peroxide in the treatment of ear disease is insisted on, since the acid preparations met with in commerce are liable to cause marked irritation. Perhydrol is free from this defect, and when diluted 1 : 14 with distilled water forms an antiseptic lotion which may be instilled into the ear, when mixed with tepid water, by the patient. Dilutions of perhydrol have found general acceptance and wide application as antipurulent washes.

Potassium Sulphoguaiacolate. G. and R. Fritz. (*Apoth. Zeit.*, **19**, 953.) The pure salt forms a crystalline odourless powder with a bitter taste, which afterwards becomes sweetish. Solubility in cold water, 1 : 3·5 ; very soluble in hot water, sparingly soluble in absolute alcohol, insoluble in ether and in chloroform. It gives a crystalline precipitate with a 5 per cent. solution of tartaric acid. Dilute solutions give a deep blue colour, which disappears on heating with one drop of Fe_2Cl_6 solution. Strong solutions give it a blood-red colour with the same reagent, which changes to blue on adding more Fe_2Cl_6 solution. Strong H_2SO_4 gives a colourless solution, which becomes brown on heating. $AgNO_3$ gives no immediate precipitate, but ultimately a grey deposit. A trace of KOH gives a reddish yellow colour, which disappears on acidifying. A 5 per cent. solution of the salt is faintly alkaline in reaction ; it shows no turbidity with $BaCl_2$ or with H_2SO_4.

Pyramidon, Nature of the Red Colouring Matter in the Urine after Administration of. — Appert and — Jaffé. (*Répertoire de Pharm.* [3], **16**, 538.) By shaking out with acetic ether the red-coloured urine of patients under treatment with pyramidon, Jaffé has isolated a new crystalline acid, rubazonic acid, $C_{20}H_{17}N_5O_2$ in needles, m.p. 184°C. ; insoluble in water, sparingly dissolved by boiling alcohol, and soluble in chloroform, acetic ether, acetone benzol and alkaline solutions. Appert finds that, though frequent, the production of this red colour after a dose of pyramidon is not invariable. Its appearance, however, is quite devoid of any significance, since it does not in any way indicate toxic action of the drug, nor, as far as can be traced, an abnormal condition of the patient.

Rhubarb and the Plants producing it. A. Tschirch. (*Schweiz. Woch.*, **42**, 512, 521.) Almost every consignment of fresh roots or seeds reputed to be those of the plant furnishing rhubarb of commerce have given, when cultivated, distinct species. After eliminating those which certainly could not be the botanical source of the drug, three species, *Rheum palmatum:* and its var. *tanguticum*, *R. officinale* and *R. collinianum*, remained. In the rhizomes of those cultivated at Berne, the following distinctive characters were observed. *Rheum palmatum*, the stellate systems were arrayed distinctly in an irregular circle, forming an evident ring, on either side of which isolated and scattered star-shaped marks occurred. *R. officinale:* the stellate systems were sparse, less numerous, and arrayed in an irregular zone rather than in a ring. *R. collinianum* in appearance is intermediate between the two above-named species, resembling more *R. palmatum*. *R. officinale* and *R. collinianum* had but a slight odour of rhubarb when dried; but that of *R. palmatum* was very powerful, sufficiently so to serve as a distinctive feature.

Commercial rhubarb falls into two distinct types—those within indistinct star-shaped markings, which are replaced by dark confused undulating lines, and those with evident star markings or circular lines, often large; these always have a darker line between the inner and outer parts. Chinese rhubarb belongs to the *palmatum* type; that resembling *officinale* is rare. The confused type is often found in Shensi, both round and flat, but rarely in Shanghai rhubarb. An unknown species occurs in Shensi rhubarb; and Chinese rhubarb, as a whole, is evidently the product of several species. Shensi and Shanghai rhubarbs gave 2·8 per cent. of emodin; Canton rhubarb 4 per cent. European rhubarb gives but little emodin; *R. palmatum* cultivated at Berne gave 2·8 per cent.; *R. officinale* gave 2 per cent., and *R. collinianum* 1·8 per cent. *R. palmatum* should therefore be the species cultivated for the production of the European drug.

Rusot, an Ancient Eastern Medicine. D. Hooper. (*Journ. Asiatic Soc. of Bengal*, 73 [2], No. 4.) Rusot is shown to be identical with the "lycium" use in medicine by the ancient Greeks; small vases bearing the name of the drug in Greek characters are found in archæological museums. At the present day rusot is met with in the Indian bazaars, in the form of an extract obtained from three species of Indian barberry, *Berberis aristata*, *B. lycium* and *B. asiatica*. It is used as a pigment and a dye as well as medicinally.

The extract is obtained by digesting in water slices of the bark, root, and twigs for a few hours, then boiling, straining, and evaporating to a soft consistence. It is a dark brown extract of the consistence of opium, having a bitter and astringent taste. It dissolves almost entirely in distilled water, and partly in rectified spirit, forming a rich yellowish-brown solution, which becomes bright yellow when diluted. The intense bitterness is due to the alkaloid berberine, which pervades the root, bark, blossoms, berries, and leaves of the plants. Four samples of this preparation are exhibited in the Indian Museum, one from United Provinces, one from Bashahr, one from Hazard, and the other from Lahore, in the Punjab. These were examined as regards the amount of moisture, extractive matter, ash and the alkaloid, berberine. The sample from the United Provinces was prepared in 1893, and was a dark-brown extract with a shining fracture. The second sample was forwarded to the Indian Museum by the Forest Ranger of the Nogli and Pahor Ranges, Bashahr Division, Punjab, in April, 1901. It was a soft extract, prepared by boiling the chips of the root of *Berberis lycium*, a shrub locally called "Chochar." In this division an extract is also made from the roots of *B. aristata*, which is known in this district "Kashmal." The third sample was from the Hazara Division, Punjab. This was a blackish, brittle extract, having the odour of liquorice. It occurred in square packets enveloped in leaves. The fourth sample was from Lahore. It consisted of triangular cakes, about one inch thick, and three inches along the side, and each enveloped in the green leaves of *Bauhinia vahlii*. The extract was of the consistence of opium, dark brown in colour, and not very homogeneous in the interior.

The following are the results of the examination :—

—	1. United Provinces.	2. Bashahr.	3 Hazara.	4. Lahore.
Water	6·70	40·31	4·00	20·98
Spirit extract	25·85	27·15	38·25	40·16
Water extract	36·25	17·43	29·32	20·85
Fibre and starch	15·50	10·00	19·23	7·65
Ash	15·70	5·11	9·20	10·36
	100·00	100·00	100·00	100·00
Berberine	7·75	2·9	3·46	4·22

The results indicate a variable amount of berberine in the samples of rusot manufactured in different districts. There is, likewise, little uniformity in the amount of extracts, insoluble material and ash, and the composition is found to differ very considerably in various portions of the same cake.

The alcoholic extract is the most valuable part of the drug, as it contains all the alkaloidal active principles; the aqueous extract, insoluble matter, and ash may be regarded as impurities. Instead of the watery extract at present made in the jungles, and which varies so considerably in composition, a preparation made with alcohol would have many advantages, as it would be more concentrated and uniform, and could be readily standardized in regard to the alkaloidal strength measured as berberine.

Salicylic Acid as a Buccal Disinfectant. (*Merck's Report*, 18, 12.) Salicylic acid is the least objectionable of any of the powerful bactericidal poisons, and as much as 15 grs. may, according to Mueller, be taken internally without harm. He specially recommends it as a disinfectant for the mouth and throat. For this purpose a solution of salicylic acid, 15 grs., in a few drachms of alcohol, is made up to 1 oz. by weight with glycerin. This, when applied to the gums and the buccal mucous membrane, has marked penetrating properties which bring the antiseptic into close contact with bacterial growths. It is specially serviceable in thrush and aphthous stomatitis, and has even acted as a palliative in mild cases of diphtheria, preventing the membrane from spreading. It may be applied with a brush to the affected parts.

Senecio vulgaris, Fluid Extract of, in Dyspepsia. Dalché. (*Journ. Pharm. Chim.*, 20, 523.) Thirty drops of fluid extract of common groundsel taken in a little sweetened water before meals has proved to be an excellent remedy in gastralgia, cramp of the stomach, in pain due to an irritated condition of the mucous membrane, and in flatulent dyspepsia. The treatment is quite harmless, but in the case of female patients should be intermitted before the menstrual period, which otherwise may be retarded or checked.

Sodium Glycocholate for Hepatic Colic. (*Merck's Report*, 18, 131.) Sodium glycocholate, in doses of 5 to 10 grs. per diem, administered in capsules, is stated to be useful as a gall-stone solvent for biliary calculi. It is also given in enlargement of the liver following chronic malaria.

Stagnin. (*Merck's Report,* **18,** 176.) Stagnin is an aseptic saline solution of the spleen of horses, and is exhibited by intramuscular injection to counteract hæmorrhages, also in myoma, hyperplasia uteri, and in menorrhagia and hæmophilia. It is injected into the gluteal region.

Stereospermum euphorioides Gum. H. Jumelle. (*Comptes rend.,* 140, 172.) This gum, which is only very slightly soluble in water, is produced by a tree of the N.O. Bignoniaceæ indigenous to Madagascar. It occurs in bright, brown brittle masses with a bright fracture ; it is soluble to some extent in alcohol 90 per cent., and in acetone, but not in other solvents. It precipitates with lead salts, and gives a green colour reaction with Fe_2Cl_6. Its slight solubility will probably preclude its use in the arts.

Styracol. (*Merck's Report,* **18,** 181.) Styracol, the cinnamic ester of guaiacol, is suggested as a substitute for the latter in phthisis and other affections for which guaiacol is prescribed. Styracol, in the intestines, is split up into guaiacol and cinnamic acid, and has been found efficient as an intestinal disinfectant. It is given as a powder or in cachets in doses of 15 grs. from 3 to 6 times a day for adults ; children may take 8 grs., and infants 4 grs.

Tincture of Immature Oranges for Diarrhœa. V. N. Vorontzoy. (*Semaine Med.,* through *Nouveaux Remèdes.,* **20,** 502.) A maceration in brandy of the small immature oranges which fall from the trees and are known as " orangettes " or " petits grains," is an excellent remedy for diarrhœa. As soon as the liquid is the colour of strong tea, it is ready for use. A liqueur-glassful may be taken by adults twice to four times a day, and it may be given to infants in doses of 10 to 15 ♏ twice or thrice daily.

Tonka Beans, Collection and Curing of. (*Pharm. Journ.* [4], **20,** 104.) The Tonka bean tree is found in different parts of tropical America, but the product imported from Para appears to be inferior to that which comes from the regions in the vicinity of the Caura and Cuchivero rivers. Although met with in patches, the tree is not by any means gregarious, so that the collection of the fruit is arduous work. In an interesting book by E. Andre, entitled *A Naturalist in the Guianas*, an account of the collection of the seeds is given. The crops, it would seem, are so irregular that it is almost impossible to forecast the yield of any particular year. It may, however, be taken as a general rule that for one or two years after a plentiful harvest the production is so scanty that it does not pay to collect the beans. In Venezuela the tree is known as "Sarrapia," and the men engaged in the collection of the seed are called "Sarrapieros." These men begin to arrive on the Caura early in February, some of them coming a considerable distance. During the months of October and November, while the fruit is still quite small and green, the large macaws and several other members of the parrot family commit great havoc upon the young crop. Hence the destruction before maturity of enormous quantities of this valuable product.

The fruit of the "Sarrapia" is much like a mango in appearance, and is largely eaten by the natives. It has but little pulp, which is sticky and of insipid taste, the seed (endocarp) being covered with a hard fur-like substance. After the "Sarrapiero" has got together a sufficient quantity of fruit, he takes his find to some open spot where he can get the benefit of strong sunlight. The hard shell is then carefully broken between two stones and the single dark brown seed extracted. The seeds are then spread out to dry, generally upon the large open masses of granite called lajas, which form so peculiar a feature of the forest of this region. The dried beans are sold by the "Sarrapieros" to the merchants of Ciudad Bolivar, where the process of crystallization, as it is called, is sometimes carried out. This operation, however, costs very much less if it can be performed in Trinidad, where the strong rum required for the process can be obtained at a cheaper rate. By the end of May or the beginning of June, the last beans have been taken, and the crop may be said to be over.

The beans are never shipped in the raw state, but are treated with strong rum, the process being called crystallizing. This is carried out as follows :—

Puncheons open at one end, placed in a row, are filled with beans to within a foot or eighteen inches of the top. Strong rum is then poured into the puncheons until they are quite full, when they are covered over with layers of bagging. At the end of 24 hours the rum not absorbed is run off the beans, and they are spread out to dry in a current of air. When first taken out of the puncheons the beans are of a dull black colour, and are soft and swollen, but in drying, shiny white crystals appear on their surface, and by the time they are ready for packing they look as if they had been sprinkled over with powdered sugar. They have shrunk a good deal; are wrinkled in appearance. They are then put into wine casks, or rum puncheons, and are ready for shipment. A tax of 25 centimes per kilogram is levied at Venezuela on exports of Tonka beans.

Trombidium grandissimum. A Medicinal Mite. D. Hooper. (*Pharm. Journ.* [4], **20,** 650.) Among the few specimens of animal materia medica used in India is a small acarid resembling a spider, the oil of which is expressed and applied in various disorders. It is known as " Bhir-buti," " Birbhoti," or " Bir bahoti " in Northern India, and occurs more frequently in the Punjab, United Provinces, and Behar. It appears on the ground in the rainy season, and is on this account called the " rain's insect "

The mite is about half an inch long, and from a quarter to three-eighths of an inch in its widest part. It is covered with a scarlet velvety down, and appears on the ground at the beginning of the rainy season in July. It is only to be found for a few weeks in the year, when it is collected and kept for sale in the bazaars. The mite and the expressed oil have a great reputation among Mahomedans as an aphrodisiac. The oil is also used as an external application for various complaints. In Bengal it is considered to act as a nervine tonic.

A chemical examination of this interesting oil has been made by E. G. Hill. The mites, purchased in Allahabad, had been kept for several months, but showed no signs of putrefaction. On pressure they yielded a deep red oil, and this was separated for purposes of analysis by extraction with ether in a cohobating apparatus. The sp. gr. of the red oil at 15°C. was 0·907; it ultimately set into a semi-solid mass, melting at 18–19°. It had a peculiar odour. With strong H_2SO_4 it gave a vivid blue colour, gradually turning green. With HNO_3 the red colour was destroyed. With nitrous acid it gave a buttery elaidin in a few hours. The following constants were determined:—Acid value, 62·3; saponification value, 194·7; ester value, 132·4; unsaponifiable, 3·7; Reichert-Meissl value, 0·55; Hehner value, 94; iodine value, 65.

The constants of the free fatty acids, consisting chiefly of the myristic and oleic acid, were found to be:—Saponification value, 199; iodine value, 66·6; m.p., 31–32°. The principal constituents were myristodiolein, with small quantities of stearin, cholesterol, colouring matter, and butyric acid. From these results the author concluded that the oil did not possess the properties of a counter-irritant which had been ascribed to it by older writers, and that its efficacy as a medicine is purely imaginary, and due to its colour.

Tuberculin. F. W. Gamble. (*Pharm. Journ.* [4], **19**, 924.) Two kinds of tuberculin are found in pharmacy :—

(1) *Tuberculinum Kochii*, Koch's "old" or original tuberculin, official in the German Pharmacopœia.

(2) Koch's "new" tuberculin, known also as tuberculin R., tuberculin T.R., and tuberculin rückstand.

Other modifications have been prepared, but they are not in use and are of no interest.

Tuberculinum Kochii. This is described in the German Pharmacopœia as a clear, brown, characteristically aromatic-smelling fluid, which, according to the formula of R. Koch, is prepared from glycerin-containing meat-broth cultures of the tubercle bacillus by evaporation to one-tenth and subsequent filtration.

This tuberculin is subjected, in Germany, to Government test with reference to the uniform presence of the specific toxin, and it is sold in officially sealed bottles. The German Pharmacopœia directs that it should be stored only in the undiluted state, required dilutions being freshly prepared with sterilized water, or better, with 0·5 per cent. phenol solution.

Tuberculin is prepared by several firms in this country according to Koch's original directions, and it is also imported from Germany in small phials bearing the Government leaden seal.

"Old" tuberculin was originally introduced for the curative treatment of all kinds of tuberculosis. Its chief use now, however, is as a diagnostic agent for the detection of tuberculosis in man and animals. Injected into the healthy no effect is produced, but in the tubercular minute doses give rise to considerable reaction; the temperature rises, more or less severe constitutional symptoms ensue, and the local lesions become swollen and inflamed. The usual diagnostic dose in man is 0·001 c.c.; if this produces no result, 0·002 c.c. may be injected after two days, and finally 0·005 c.c. after a like interval. Absence of reaction to these doses indicates that the individual is non-tubercular.

Koch's "old" tuberculin is still occasionally used as a curative agent, generally in succession to a course of " new " tuberculin. Modern methods of estimating the reaction of the blood to " old " and " new " tuberculin indicate that the curative doses originally recommended by Koch were much too large and too frequently administered.

The two kinds of tuberculin should be carefully distinguished; having been confused in this country, and published descriptions of the one given for the other. The dosage of the " old " tuberculin is expressed in terms of the original strong solution.

Koch's " New " Tuberculin. Tuberculin R. or T.R. is an opalescent liquid similar in appearance to a mixture of 5 or 6 drops of milk with half an ounce of water. It is prepared from a virulent culture of tubercle bacilli. The latter are dried, broken up by trituration, and emulsified with distilled water. The liquid is centrifugalized and the residue again dried, triturated, emulsified, and centrifugalized. The second supernatant liquid, suitably prepared to contain 10 Mgm. of solid bacterial substance in 1 c.c. becomes " new " tuberculin.

The dose is reckoned in milligrammes, of solid substance, not, as in the case of " old " tuberculin, in cubic centimetres of concentrated liquid. Tuberculin R. is diluted for use with sterilized 20 per cent. glycerin solution in distilled water, the usual initial dose being 1/500 Mgm. of solid substance, equal to 0·2 c.c. of 1 : 1000 dilution of the concentrated fluid. This dose is very gradually increased to 1/10, ¼, ½, or even ¾ Mgm. As " new " tuberculin has been reported sometimes to contain active tubercle bacilli, it is necessary to sterilize the dilutions or the concentrated fluid at 60°C. for one hour. At this temperature any bacilli present will be killed, whilst the active toxins remain unaffected.

Tuberculin R. is used as a curative agent in tuberculous conditions, especially in tuberculosis of the bladder and of the lungs. It is not of use for diagnostic purposes. The present tendency is to avoid the use of doses large enough to produce external symptoms of reaction. The frequency with which the doses should be injected and rate of increase of the dose have, until recently, been judged by the external signs of reaction or their absence. Recently, a method of measuring the reaction in the blood itself has been devised. This depends upon the fact that injection of tuberculin causes the formation in the blood of tuberculotropic substances called opsonins, whose function is to prepare the bacilli for phagocytosis. The opsonic power of a specimen of blood serum is ascertained by mixing it with an active culture of tubercle bacilli and some washed blood corpuscles. After incubation a count is made of the number of bacilli ingested by a certain number of white blood corpuscles, the average for each corpuscle forming the opsonic index.

Turicine. (*Schweiz. Woch.*, through *Journ. Pharm. Chim.* [6], **20,** 275.) This new antidiarrhœic is a combination of tannin and gluten casein; it is a tasteless and odourless flesh-coloured powder, insoluble in water but soluble in dilute alkalies and in ammonia. As it is very resistant to the gastric secretions, it does not derange the stomach. A special form of turicine is prepared for infants containing 20 per cent. of turicine with vegetable protein, a little starch and aromatics.

Valerian Juice, Physiological Action of. — Pouchet and Chevalier. (*Journ. Pharm. Chim.*, **21,** 127.) Freshly expressed juice of valerian root has a distinct sedative action on the heart, and acts markedly as an antispasmodic, yet chemical valerianates and galenical preparations of dry valerian have an opposite action, being distinctly excitants of the central nervous system.

Valerian Root, Derbyshire, Botanical Source of the Drug. E. Drabble and F. A. Upsher Smith. (*Pharm. Journ.* [4], **19,** 701.) The drug has hitherto been officially referred to *V. officinalis*, Linn. This name, however, was considered by the younger Mikan to include two distinct species. He separated from the aggregate species a form with fewer, broader leaflets, usually toothed on both edges, describing it under the name *V. sambucifolia*, retaining for the plant with more numerous leaflets (six and more pairs), usually toothed on the posterior margin only, the name *V. officinalis*. This, however, could no longer be considered as *V. officinalis*, Linn. Syme later proposed the name *V. mikanii* for the plant remaining after separation of *V. sambucifolia*, Mikan *fils*, and this name has been generally adopted.

In Derbyshire both *V. sambucifolia* and *V. mikanii* occur. The former is plentiful on the coal measures, but according to the Rev. W. R. Linton (*Flora of Derbyshire*) it avoids the limestone—a conclusion fully borne out by our own observations. On the limestone *V. sambucifolia* is replaced by *V. mikanii*.

It is the custom in Derbyshire for cultivators of valerian to gather the wild plants in woods in early spring, the collecting grounds being the limestone dales, particularly Darley Dale. This plant is proved to be *V. mikanii.*

It is noted that cats have a marked predilection for *V. mikanii*, but that they are not attracted by growing plants of *V. sambucifolia.* Full botanical descriptions of the two species are given.

Validol for Sea-Sickness. (*Nouveaux Remèdes*, **21,** 175.) Scognamiglio records a case in which severe sea-sickness was regularly warded off by doses of 15 to 20 drops of validol taken at the time of embarking. Brenning, from experience gained in the Nord Deutscher Lloyd service, confirms the statement, and has found validol the best of all remedies for sea-sickness. Mos favourable results have been obtained in hundreds of cases by the administration of 8 to 15 drops of validol on sugar, repeated several times a day.

West Australian Poisonous Plants. E. M. Holmes. (*Pharm. Journ.* [4], **20,** 140.) Three specimens of plants supposed to be poisonous to cattle in West Australia, received through H. A. Schlesinger, and sent to the Museum of the Pharmaceutical Society for identification, proved to belong to the following species, viz. :—(1) *Gasterolobium bidens*, Meissn. ; (2) *Gasterolobium polystachyum*, Meissn. ; (3) *Mirbelia racemosa*, Turcz.

J. H. Maiden, in *The Useful Native Plants of Australia* (1889), p. 129, mentions the following species as commonly known as Poison Bushes, viz. :—*Gasterolobium bilobum*, R. Br. ; *G. callistachys*, Meissn. ; *G. calycinum*, Benth. ; *G. obovatum*, Benth. ; *G. oxylobioides*, Benth. ; *G. Spinosum*, Benth ; *G. hilobum*, Benth. Of these species of *Gasterolobium*, *G. calycinum* is stated to be most dangerous ; and it is equally fatal to sheep and cattle. Dogs eating the offal of the dead animals are also poisoned. The plants of the genus require chemical investigation to determine the nature of the poison, and a reliable antidote would be of the greatest value. The poison appears to be of a narcotic and not of an irritant nature.

PHARMACY

PART III

PHARMACY

Acacia Mucilage. G. Pinchbeck. (*Pharm. Journ.* [4], **20,** 620.) In the light of the researches of E. Bourquelot (*Year-Book*, **1904,** 282) the author has made comparative experiments with mucilage of acacia containing oxydase, made in the ordinary way, and mucilage prepared from the same gum in which the oxydase was destroyed by heating in a sterilizer to 100°C. The only effect of this heating was to render the mucilage more fluid.

It is found that the elimination of the oxydase (which ensures the retention of the full physiological activity of the drug emulsified) does not impair the emulsifying power of the mucilage, and that the heating has a marked improvement on its preservation. It is therefore suggested that mucilage of acacia should be officially directed to be heated to 100°C. to eliminate the oxydase.

No. of Experiment	Name of Preparation	Note	Comparative effects with :—	
			(*a*) Mucilage With Oxydase.	(*b*) Mucilage. Oxydase Free.
1 .	Ext. Filicis Liq.	1	Emulsion exhibits sediment to standing overnight.	No sediment under the same conditions.
2 .	Ol. Morrhuæ .		Oxidation evident on standing.	No oxidation evident after some time (14 days).
3 .	Paraffinum Liq.	2		Emulsion slightly more opalescent than A.
4 .	Ol. Santal . .			
5 .	Ol. Terebinth .			
6 .	Bals. Copaibæ .			
7 .	Tr.Guaiaci Amm.	3	Uniformly emulsified, oxidation on standing some time.	Uniformly suspended ; no oxidation after some time.
8 .	Ext. Cinch. Liq.			
9 .	Aspirin Acetyl-salicylic Acid)	4	Compact deposit on standing ; difficult to diffuse.	Rate of fall of particles proportionately equal to A. Deposit agglutinates less, and is readily diffusible on shaking.
10 .	Bismuth Carb. .			
11 .	Hydrarg. Sub-chlor. + Aq. Calcis . . .	5		Oxidation of the mercurous oxide to mercuric oxide (yellow) retarded

Note 1. 3 Gm. of the liquid extract was intimately mixed with 6 c.c. mucilage in a mortar, and distilled water added to produce 30 c.c.

Note 2. 1·5 c.c. was added by degrees to 11·5 c.c. mucilage, and water added to produce 30 c.c.

Note 3. 4 c.c. of the preparation was added by degrees to 2 c.c. of mucilage, constantly triturating until an emulsion was formed, then adding distilled water to produce 30 c.c.

Note 4. 1 Gm. of the solid was rubbed down in a mortar with 2 c.c. of mucilage, and water added to produce 30 c.c.

Note 5. 0·2 Gm. mercurous chloride was triturated with 4 c.c. mucilage. 8 c.c. solution of lime added gradually, transferred to a bottle and well shaken; then sufficient lime solution to produce 30 c.c.

Acetic Extracts. A. R. S. Dohme. (*Proc. Amer. Pharm. Assoc.*, **52,** 337.) *Belladonna Leaf.* 100 Gm. of belladonna leaf, assaying 0·57 per cent. of total alkaloids, was extracted with 850 c.c. of 10 per cent. acetic acid. The valoid fluid extract obtained was a dark brown liquid, sp. gr. 1·13. It yielded 0·54 per cent. of total alkaloids, therefore showing practically no loss; 100 Gm. of the same fluid extracted gave, when evaporated on the water-bath, 35 Gm. of solid extract, which assayed 1·47 per cent. of total alkaloid, or 0·52 per cent. on the drug. The official (U.S.P.) alcoholic menstruum, alcohol 9·5 per cent., or 54·5 per cent. by volume, does not yield more than 25 per cent. of extract.

Colchicum Seeds. The fluid extract obtained with 10 per cent. acetic acid had the sp. gr. 1·098. It assayed 0·41 per cent. of colchicine, the same as the seeds employed, and therefore showed no loss. It gave 23 per cent. of solid extract, assaying 1·65 per cent. of colchicine, equivalent to 0·38 per cent. calculated on the drug. The U.S.P. alcoholic menstruum, 54·5 per cent., gives only 15 per cent. of solid extract.

Digitalis. The fluid extract obtained with 10 per cent. acetic acid had the sp. gr. 1·176 and assayed 0·35 per cent. of digitoxin, compared with 0·42 per cent. in the original leaves, or a loss of 17 per cent. of the total digitoxin press. When evaporated this gave no less than 47 per cent. of extractive, whereas the official U.S.P. menstruum, alcohol 54·5 per cent., gives but 25 per cent. This extract assayed 0·52 per cent. of digitoxin, which is equivalent to 0·24 per cent. calculated on the drug, showing a loss of 42 per cent. of the digitoxin originally present. This indicates that acetic acid hydrolyses digitoxin, and therefore is not a suitable menstruum for pharmaceutical preparations of digitalis.

Lobelia. Lobelia herb assaying 0·45 per cent. of lobeline gave a fluid extract with 10 per cent. acetic acid, yielding 0·39 per cent. of that alkaloid, or a loss of 0·06 per cent. on the drug, equivalent to 14 per cent. of the alkaloid present. This gave on evaporation 30 per cent. of extract assaying 1·03 per cent. of lobeline, or 0·310 per cent. on the drug, showing a loss of 34 per cent. of the total alkaloid present. Here again acetic acid is not as suitable a menstruum as the 15 under proof (48·6 per cent.) alcohol of the U.S.P.

Adrenaline Ointment. — Mignon. (*Bull. gén. de Therapeut.*, 1904, **148,** 639.) The following ointment is specially useful for the application of adrenaline in cases of affections of the nose or larynx: Adrenaline, 3 Cgm.; white liquid paraffin, 3 Gm.; white vaseline, 12 Gm.; oil of geranium, 3 drops; lanoline, 15 Gm. It is also of great service in the treatment of hæmorrhoids.

Alkaline Antiseptic Solution N.F. (*Proc. Amer. Pharm. Assoc.*, **52,** 198.) The following new formula has been devised: Potassium bicarbonate, 32 Gm.; sodium benzoate, 32 Gm.; borax, 8 Gm.; thymol, 0·20 Gm.; eucalyptol, 0·2 c.c.; peppermint oil, 0·2 c.c.; wintergreen oil, 0·2 c.c.; tincture of cudbear, 15 c.c.; alcohol 91 per cent., 60 c.c.; glycerin, 250 c.c.; water q.s. to make 1000 c.c. Dissolve the salts in 600 c.c. of water, the thymol and essential oils in the alcohol; mix the latter solution with the glycerin and add the aqueous liquid, then the cudbear tincture, and lastly enough water to make up to 1,000 c.c. Allow to stand for a few days, then filter, adding a little magnesium carbonate on the filter if necessary.

Aloes, Detection and Differentiation of, in Compound Rhubarb Pills. T. Fawsett. (*Pharm. Journ.* [4], **19,** 401.) The nature of the aloes present in compound rhubarb pills may be determined as follows:—

Remove the coating and rub the pill to fine powder (drying if necessary). Of this take 3 grs., mix it thoroughly with ½ gr. of powdered $K_6Fe_2Cy_{12}$, and of the mixture place a quantity about equal in size to a coriander fruit upon a microscopic slip; add enough distilled water to form a thin paste, which spread out into a spot about ¾ in. in diameter and allow it to dry thoroughly.

Upon examining this spot under the microscope by transmitted lamplight, using a low power, the aloes in the pill will be found to present the following appearances :—

Socotrine. Rounded pieces of a yellow colour (sometimes brown or green) ; often looking somewhat like potatoes.

Barbados. Rounded pieces of a decidedly red colour, and similar in shape to Socotrine. This kind of aloes stains the ferricyanide red beyond the margin of the aloes itself.

Cape. Irregularly shaped *glassy* pieces of a pale green colour.

If the ferricyanide at the edges of the spot is coloured even slightly red, either Barbados or Curaçao aloes is probably present. All the other ingredients of Pil. Rhei Co. appear to be unaffected by ferricyanide of potassium of the strength used.

Ten samples of compound rhubarb pills, obtained from various sources, when subjected to the test gave the following results :—

No of Sample	Kind of Aloes found.
1	Socotrine, Barbados and Cape.
2	Socotrine and Barbados.
3	Socotrine and Barbados.
*4 . . .	Barbados in excess.
5	Barbados.
6	Socotrine and Barbados.
7	Socotrine and Barbados in deficient quantity.
*8	Barbados in excess.
9	Socotrine and Barbados.
10	Socotrine.

The three kinds before-named are probably those most likely to be used in pill-making at the present moment, but the following colour reactions with ferricyanide may be observed with some varieties of aloes not in such general demand, viz. : Curaçao "Livery," greenish-brown ; Curaçao, "Capey," greenish-brown, turning slowly crimson ; Natal, pale greenish-brown ; Zanzibar, pale brown.

If the still moist spots of the above experiments have the vapour of ammonia passed over them, "livery" Curaçao, Natal, Zanzibar, Socotrine and Cape all change to various shades of brown, but Barbados and "Capey" Curaçao turn purple.

---

* Nos. 4 and 8, although clearly labelled "Compound Rhubarb Pills," were apparently Pil. Aloes Barb.

Ammonium Acetate and Extract of Cinchona, Incompatibility of. E. Crouzel. (*Répertoire* [3], **16,** 301.) Prescriptions are often met with in Continental pharmacy which call for the combination of solution of ammonium acetate and extract of cinchona. When those ingredients are mixed, a more or less copious precipitate is formed, according to the amount of cinchona extract present. Moreover, a greater precipitate is given with a preparation rich in quinine than with one which contains a smaller quantity. Ammonium acetate is not incompatible with extracts of coca, kola, or opium. [See also p. 243].

Antiseptic Solution N.F. (*Proc. Amer. Pharm. Assoc.*, **52,** 199.) The following new formula has been suggested: Thymol, 0·5 Gm.; eucalyptol, 0·5 c.c.; Mitcham peppermint, 1 c.c.; wintergreen oil, 1 c.c.; fluid extract of wild indigo, 16 c.c.; natural benzoic acid, 16 Gm.; boric acid, 16 Gm.; talcum 10 Gm.; alcohol 91 per cent., 375 c.c.; water, 625 c.c. Dissolve the thymol, eucalyptol and essential oils in the alcohol, add the fluid extract and the benzoic acid; dissolve the boric acid in the water with heat, and add to the alcoholic solution; then add the talcum, allow to stand for a few hours, cool to 15°, and filter.

Assay of Medicated Dressings. A. Kremel. (*Pharm. Post*, **38,** 264.) *Boric Acid Dressings.* Five to 6 Gm. of wool or 25 Cm. of gauze are treated in a beaker with 200 c.c. of 20 per cent. aqueous solution of glycerin. After thorough and prolonged working of the material in the liquid with a glass rod, 100 c.c. of the liquid is poured off and titrated with N/10NaOH solution, using phenolphthalein as indicator. Each c.c. of solution used = 0·0062 Gm. H_3BO_3. The result × 2 gives the HBO_3 in the quantity of material taken.

Ferric Chloride Dressings. From 5 to 6 Gm. of the material is treated in a beaker with 10 c.c. of dilute HCl and 190 c.c. of water. After well kneading with a glass rod, 100 c.c. of the liquid is decanted into a stoppered flask and 2 Gm. of KI are added. After standing for an hour the free iodine is titrated in the usual manner with N/10$Na_2S_2O_3$ solution, each c.c. of which used up is equivalent to 0·01625 Gm. $Fe2Cl_6$. The result × 2 gives the quantity present in the material.

Iodoform Dressings. From 5 to 6 Gm. of wool or 25 Cm. of gauze are treated in a stoppered flask with 150 c.c. of ether-alcohol, with frequent shaking, for 2 hours. Fifty c.c. of the solution is measured off into a flask, 50 c.c. of N10/$AgNO_3$ solution is added, with 5 c.c. of dilute HNO_3 and the mixture is heated on the water-bath under a reflux condenser for 20 minutes. After cooling, 20 drops of iron alum solution are added and the uncombined $AgNO_3$ titrated in the usual manner with N10/AmCNS solution. The number of c.c. of this solution used to give a red tint is subtracted from 50, and the remainder ×0·0131×3 gives the amount of iodoform in the quantity of material taken.

Carbolic Acid Dressings. From 5 to 6 Gm. of wool or 25 Cm. of gauze are macerated in a beaker with a mixture of 5 c.c. of caustic soda solution and 245 c.c. of water. After thorough and prolonged kneading with a glass rod, 25 c.c. of the solution is transferred to a stoppered flask and treated with 50 c.c. of $KBrO_3$ solution (1·667 $KBrO_3$ in 1 litre), 50 c.c. of KBr solution (5·94 KBr in 1 litre), and 5 c.c. of strong H_2SO_4. After standing well stoppered for 15 minutes, 1 Gm. of KI is added, and the free iodine titrated with N/10$Na_2S_2O_3$ solution. The number of c.c. of N10/$Na_2S_2O_3$ solution used up subtracted from 30, the remainder ×0·00156×10 gives the amount of phenol in the quantity of material taken.

Sublimate Dressings. Since these dressings usually contain but 1 per mille of $HgCl_2$, a larger quantity must be taken for assay; 1 metre of gauze or 20 Gm. of wool. This is macerated in a capacious beaker with 500 c.c. of 1 per cent. NaCl solution. After thorough kneading with a glass rod, 250 c.c. of the solution is withdrawn, acidified with HCl, and treated with 50 to 100 c.c. of freshly prepared SH_2 solution. After standing, the precipitated HgS is collected on a tared filter, washed with water containing SH_2, and dried at 100°C. The dry precipitate is then washed with a few c.c. of CS_2, again dried, and weighed. The weight found ×2×1·168 gives the amount of $HgCl_2$ in the quantity of material taken.

Salicylic Acid Dressings. 250 Cm. of gauze or 5 to 10 Gm. of wool are macerated with 200 c.c. of alcohol; after thorough kneading with a glass rod, 100 c.c. of the solution is taken, diluted with water, and titrated with N/10NaOH solution, with litmus as indicator. The number of c.c. used ×0·0138×2 gives the weight of acid in the material as taken. This may be calculated into percentage by drying and weighing the residual dressing after the treatment with alcohol.

Basic Bismuth Gallate Dressing. From 5 to 6 Gm. of wool or 25 cm. of gauze are macerated, as above, with 10 c.c. of N/NaOH solution and 190 c.c. of water. 100 c.c. of the liquid is then decanted and treated with 5 c.c. of N/HCl solution. The precipitate formed is collected, washed and dried. It is then ignited, the residue dissolved in HNO_3, evaporated to dryness, and again ashed. The weight of Bi_2O_3 thus obtained × 2 × 1·88 gives the amount of basic bismuth gallate in the quantity of material taken.

Balsam of Peru in Ointments. — Bischoff. (*Apoth. Zeit.*) Peruvian balsam does not give a satisfactory ointment with any form of paraffin basis, or when soft paraffin is added to a lard basis already combined with the balsam. Issleib has attributed the separation observed when the balsam is mixed with boric acid ointment to the acid, but Bischoff states that this is not so, since it is perfectly miscible with the ointment prepared with lard; according to Lister's original formula, Issleib finds that a perfect ointment may be obtained by the use of carnauba wax. The incompatibility may be overcome by first rubbing down the boric acid, or any other medication, such as iodoform, with a little castor oil. This is then mixed with the petrolatum and the balsam added afterwards.

Bark Mixtures, Manipulation of. H. Wyatt. (*Pharm. Journ.* [4], **19,** 898.) Acid. nit. mur. dil., ʒiss; spt. chlorof., ʒiss; Ext. cinchon. liq., ʒiss; aquam., ad ℥vj. M. ft. mist. Mix the acid, spt. chlorof. and extract together and pour into the water. Any other way gives a flaky deposit.

This is further shown in the following mixture: Tinct. cinchonæ, ʒij.; acid. sulph. dil., ʒij.; Aq. chloroform, ad ℥iv. M. ft. mist.

Mix the tincture with the acid and pour into the water. If the order be reversed, and the tincture added to the acid and water, a precipitate of a much darker colour and much more bulky comes down.

Belladonna, Extract of; Formula of the New French Codex (International Formula). L. Grimbert. (*Journ. Pharm. Chim.* [6], **20,** 211.) Coarsely powdered belladonna leaves, 1 kilo.; alcohol 70 per cent., 6 kilos. Moisten the powder with a portion of the 2 kilos. of alcohol, and pack in a percolator, add the rest of the 2 kilos. and allow to macerate for 24 hours ; then percolate and continue the extraction with the remaining 4 kilos. of alcohol. Distil the percolate to recover the alcohol, and evaporate to the consistence of a thick fluid extract. *Characters.*—A brown extract with a peculiar odour, entirely soluble in alcohol 70 per cent. It should not contain more than 10 per cent. of water. *Determination of alkaloids.*—Dissolve 2 Gm. of the extract in 10 Gm. of alcohol 60 per cent. in a 125 c.c. flask. Add to the solution ether 50 Gm., and chloroform 20 Gm., then, after thorough agitation, 10 c.c. of a 25 per cent. solution of Na_2CO_3 ; set aside for 1 hour with frequent agitation. Then filter through a dry, well-covered filter into a small flask 50 Gm. of the ether chloroform, representing $\frac{2}{3}$ of the original extract, and distil the filtrate to one half its volume ; transfer this to a separator, washing out the distillation flask with separate 5 c.c.'s of ether. Shake up the bulked liquid with 30 c.c. of N/100 H_2SO_4, adding, if necessary, a little more ether to make the ethereal layer float on the surface of the acid liquid ; after complete separation, filter the aqueous layer through a small filter, wash the ether chloroform again with 3 separate 10 c.c. of water, pass this through the same filter, and make up the volume to 100 c.c. Add to this enough ether to give, after agitation, a layer 1 cm. deep, and then titrate back the free acid with N/100 NaOH solution, using iodeosin as indicator. The number of c.c. used up subtracted from 30, the remainder divided by 2, multiplied by 3 and then by 0·00289, will give the quantity of alkaloid in 2 Gm. of extract.

Belladonna Leaves, Standardized, Powdered Alcoholic Extract of. E. H. Farr and R. Wright. (*Pharm. Journ.* [4], **20,** 398.) Continuing their work on powdered standardized alcoholic extracts (see *Year-Book,* **1904,** 464), attention has been directed to belladonna leaves. The investigation includes :—

(1) Determination of the average amount of alkaloid in the commercial dried leaves.

(2) The determination of the alkaloid in a number of samples of the official extract which it is proposed to displace.

(3) The treatment of several samples of the drug by percolation under varying conditions with alcoholic menstrua of different strengths, and the estimation of the alkaloid and dry extract and the proportion of the former in the latter in the various percolates.

(4) The consideration of the proper standard for the powdered extract.

(5) The observation of the effect of exposure to air upon the stability of the finished product.

(1) *Assay of the Drug.* As the result of the assay of 19 samples of the dried leaves the mean alkaloidal content was found to be 0·547 per cent., with 1·32 for a maximum and 0·14 for a minimum.

(2) *Amount of Alkaloid in Extract.* The proportion of alkaloid in the official green extract of belladonna varies enormously, as shown by the following figures by different workers :—

Barclay	Min. 0·77	Max. 1·24	Average	7 samples 1·0	
Farr and Wright	Min. 0·52	Max. 1·33	Average	6 samples 0·93	
Naylor and Bryant	Min. 0·55	Max. 1·80	Average	10 samples 1·07	
J. C. Umney	Min. 0·94	Max. 1·26	Average	3 samples 1·13	
	1880.	1881.	1884.	1885.	1892.
Squire	(1) 1·22	(1) 1·16	1·21	(1) 0·73	1·7
	(2) 1·26	(2) 1·21	—	(2) 0·94	—
				(3) 1·11	—
				(4) 1·17	—
Southall's Laboratory	1900.	1901.	1902.	1903.	1904.
Reports	1·10	1·38	1·50	0·87	1·08

(3) *Method of Preparation.* As the result of a large number of experiments described in detail, alcohol 70 per cent. was found to be the best menstruum for the preparation of the dry extract.

The general process for the preparation of the standardized extract is as follows :—

Take any convenient quantity of the drug in No. 40 powder, moisten it with one-fourth its bulk of 70 per cent. alcohol, pack firmly in a percolator, add more menstruum and allow percolation to proceed until a volume of percolate equal to 4 times the bulk of the drug w/v has been collected. Press the marc, mix the liquids, filter. Determine the amount of dry extract yielded by the percolate and the proportion of alkaloid contained therein. Take any convenient quantity of the percolate, mix with it an amount of the diluent (powdered belladonna leaf of known alkaloidal strength) somewhat less than calculation has shown will be necessary to bring down the dry extract to the required standard, recover the alcohol by distillation and dry the residue in a shallow, flat, tared dish, first over a water-bath and finally in a current of warm air at a temperature of from 60°–80°C. until the weight is fairly constant. Take the weight of the dish with its contents, calculate the additional amount of the diluent which will be required, add this to the product of evaporation, transfer the whole to a dry, slightly warmed mortar, and triturate carefully until thoroughly mixed. Finally, pass the powdered extract through a No. 20 sieve, transfer to a well corked or glass stoppered bottle, and preserve in a cool, dry place.

The addition of the powder to the liquid before evaporation is recommended, because we have found by experience that evaporation is thereby greatly facilitated, the formation of lumps is prevented, the amalgamation of the particles of extract and diluent is rendered much more intimate, and the removal of the product from the dish is rendered easier of accomplishment. The standardized extract may be assayed by Bird's process for belladonna leaves or by the following method :—

Take of—

Powdered extract of belladonna leaf . . .	5 Gm.
A mixture of Acetic acid, B.P., 1 volume 70 per cent. alcohol, 9 volumes	a sufficient quantity.

Slightly damp the powder with a little of the menstruum, pack tightly in a small tube to which an air-pressure ball has been attached, and percolate under pressure until 50 c.c. percolate has been collected. Determine the alkaloid in the percolate by the official assay process. The amount of alkaloid thus indicated, multiplied by 20, gives the required percentage.

(4) *Alkaloidal Standard.* In deciding upon a standard for the extract, several matters have to be taken into consideration. It is evident, for instance, that to fix upon a standard for general use which could only be attained by the employment of special menstrua or secret methods would not be a commendable proceeding.

There is almost as great an objection to taking, as the basis of calculation, the results obtained from the best samples of English drug.

A standard of 2 per cent. or upwards can be easily attained.

Viewed in the abstract, the proper method would be to take a fair average, based upon the results obtained from a number of samples of genuine leaves, some British and some foreign.

When the subject is viewed from an official standpoint, however, other questions have to be taken into consideration.

For example, there are two solid extracts of belladonna at present official, and it is quite possible that both may be retained in the next Pharmacopœia. These are largely prescribed without discrimination by medical men, and often dispensed indiscriminately by pharmacists, so that it is a matter of no slight importance that the standards shall be, if not identical, at any rate approximately the same in each case.

Maben has proposed (*Year-Book,* **1904,** 263) that the standard for the root extract shall be raised to something over 1·5 per cent., and that an alcoholic extract of the leaf of the same standard of strength shall be officialized.

This suggestion brings other considerations into view, all of which need to be stated before a sound conclusion can be arrived at.

The standardization of galenicals, and more especially extracts, must be carried out, in view of the fact that there is a point beyond which a high standard may become an element of danger to the patient. In the case of an extract of belladonna, whether from leaf or root, a 1 per cent. standard means that each grain of the extract contains 1/100-grain of alkaloid, and as this represents the maximum dose of atropine or hyoscyamine, it is evident that the proportion of alkaloid in the extract could not safely be increased much beyond that point.

In deciding upon an alkaloidal standard for an extract, regard must be had to the permanence and stability of the finished product. Most dry extracts have a tendency to absorb moisture, and manifestly the greater the proportion of such an extract in the resulting preparation, the greater the danger from this source. In order to secure permanency and to prevent clogging, it is essential that thè dry extract shall be well diluted. The abstracts of the United States Pharmacopœia were discarded mainly because their excessive concentration precluded the fulfilment of this condition.

Changes (and, above all, frequent changes) in the strength of official preparations of great potency are to be deprecated unless shown to be absolutely necessary. To vary the standards frequently or unnecessarily involves difficulty to both prescriber and dispenser, and danger to the patient.

(5) *Effect of Free Exposure to Air upon the Standardized Powdered Extract.* Six samples of the powdered extract prepared with alcohol of various strength were exposed to the air; all were found to be more or less hygroscopic.

Belladonna Root, Exhaustion of, with Alcohol. Elsie S. Hooper. (*Pharm. Journ.* [4], **19,** 140.) An exhaustive communication on the extraction of belladonna root with alcohol, as in the preparation of the official liquid extract, is thus summarized :—

Exhaustion is most rapid when the drug is moistened with 25 c.c. for every 100 Gm. weight of the drug.

The B.P. method is defective in two respects : (*a*) The quantity of menstruum to moisten is too large ; (*b*) It is inexpedient to pour on liquid till it drops through, and then close and macerate.

Practically the whole of the alkaloid of 800 Gm. of root is contained in the first 300 c.c. of percolate obtained by repercolation in four quantities under proper conditions.

Assays of the root by Keller's, Panchaud's, Dunstan's, and Bird's processes are practically identical. On account of rapidity and simplicity, Keller's or Panchaud's processes deserve preference.

Belladonna Root, Standardized Powdered Alcoholic Extract. E. H. Farr and R. Wright. (*Pharm. Journ.* [4], 20, 546.) In the present edition of the Pharmacopœia the standardized liquid extract was made the basis of the other preparations of the root ; the solid extract being retained, but its strength being reduced to 1 per cent.

By an unfortunate oversight the characters of the preparation were omitted from the Pharmacopœia, with the result that manufacturers continued to send out as a semi-solid extract a preparation which should have had the characters of a powdered extract.

The experiments which have been made on the subject have not been carried out with the idea of displacing the present official root extract, but rather with the object of providing future workers on the pharmacy of belladonna root with facts and figures for their guidance. This has been carried out on the same lines as in the case of the extract of belladonna leaf, and includes :—

(1) The examination of samples of the crude drug, in order to ascertain the average amount of alkaloids therein contained.

(2) The treatment of several samples of the powdered drug by percolation under varying conditions with alcoholic menstrua of different strengths, and the determination of the alkaloids and dry extract, and the proportion of the former in the latter in the various percolates.

(3) Suggestions for alkaloidal standards for the powdered extract.

(4) The microscopic recognition of the extract.

(5) Effect of exposure to air upon the stability of the finished product.

(1) *Proportion of Alkaloids in Belladonna Root.* Seven samples of belladonna root were examined, and yielded as an average 0·438. Minimum, 0·31 per cent.; maximum, 0·64 per cent. All the samples examined, with two exceptions, contained over 0·4 per cent. alkaloids. This has been suggested by Cripps (0·4 to 0·6).

(2) *The Menstruum for the Extraction Process.* After numerous experiments, alcohol 70 per cent., as in the case of belladonna leaf, was found to be the most suitable menstruum.

(3) *Alkaloidal Standard for the Powdered Extract.* There would be no difficulty in preparing a standard of anything from 1 to 5 per cent., as might be deemed advisable. The method of preparation and standardization are the same as for powdered belladonna leaf extract (*supra*). The diluent employed should be powdered belladonna root of known alkaloidal strength.

(4) *Microscopical Recognition.* It is found that the histological elements of both the powdered root and powdered leaf undergo very little change in the process of evaporating and drying the extract, even the starch grains being in most cases unaffected. For microscopical examination, the extractive and colouring matter should first be removed by extraction with warm 70 per cent. alcohol; the residue is then cleared in chloral hydrate solution; a little KOH may sometimes be necessary, but this dissolves starch and cell contents.

The following are the special features of powdered belladonna leaf: (*a*) Striated cuticle; (*b*) Epidermal cells with ridges on surface and irregular sinuous margins; (*c*) Stomata connected with 3 or rarely 4 epidermal cells, of which one is much smaller than the others; (*d*) Sandy crystals of calcium oxalate in most fragments of leaf of any size; (*e*) Fragments of glandular hairs are occasionally met with.

In the case of the root, attention may be drawn to the following features: (*a*) Characteristic sandy crystals of calcium oxalate; (*b*) Starch grains. These are either simple or compound, the former being round or oval, and the latter more or less irregular. Most of the grains are furnished with a well-marked hilum, but the concentric markings are not very evident. The other characters are chiefly negative.

(5) *Absorption of Moisture on Exposure to Air.* All the powdered extracts showed a slight hygroscopic tendency, and should therefore be carefully stored.

Benzoinated Paraffin. F. E. Niece. (*Drug. Circ.*, **49**, 223.) Liquid paraffin, 16; gum benzoin, 1. Digest on the sand-bath for half an hour, and filter. This preparation is a neutral, bland menstruum suitable for applying various antiseptics by means of a spray or atomizer.

Blood Acid-Albumin Preparations. (*Pharm. Centralh.*, **45**, 610.) Blood acid-albumen is placed on the market as a nutritive in the form of a coarse dark powder with whitish particles and a faint cinnamon odour. It is also prepared in an odourless form as a fine powder. One part is stated to be equivalent to about 6 parts of fresh defibrinated blood. It is soluble in warm water, giving a solution with an acid reaction which does not coagulate on boiling. (1) *Elixir of Blood Acid-Albumin.*—Blood acid-albumin, 30 Gm.; simple syrup, 200 Gm.; alcohol 90 per cent., 125 Gm.; tincture of fresh orange-peel, 2 Gm.; aromatic tincture, 10 Gm.; tincture of vanilla, 4 Gm.; tincture of cinnamon, 4 Gm.; acetic ether, 10 drops; distilled water to 1,000 Gm. The albumin is dissolved in water on the water-bath at 50–60°C., and mixed, when cold, with the other ingredients. (2) *Strong Elixir of Blood Acid-Albumin.*—Blood acid-albumin, 60 to 80 Gm.; alcohol 90 per cent., 50 Gm.; glycerin, 250 Gm.; flavours as above (formula 1); distilled water to 1,000 Gm. Dissolve the acid-albumin on the water-bath in a mixture of the glycerin and water; proceed as in formula 1. (3) *Elixir of Blood Acid-Albumin with Cinchona or Condurango.*—Elixir of blood acid-albumin, No. 1, 98; liquid extract of cinchona, 2; or liquid extract of condurango, 2. Mix. (4) *Wine of Blood Acid-Albumin.*—Blood acid-albumin, 3; glycerin, 6; distilled water, 21; alcohol 90 per cent., 5; prepared Malaga wine to 100. Proceed as above. The organic salts in any wine employed should first be converted into chlorides by the addition of hydrochloric acid, 1, to wine, 200; the mixture should be allowed to stand for 24 hours before adding it to the acid-albumin solution. (5) *Malt Extract with Blood Acid-Albumin.*—Blood acid-albumin, in fine powder, 1; glycerin, or simple syrup, 2; extract of malt to 20. Rub down the acid-albumin with the syrup or glycerin, heat gently on the water-bath, mix with the malt extract and heat for a short time, not exceeding 60°C. (6) *Malt Extract and Cod Liver Oil with Blood Acid-Albumin.*—Blood acid-albumin in fine powder, 1; glycerin, 2; malt extract, 10. Proceed as in formula No. 5; finally add cod liver oil, 8 to 10, incorporating the oil gradually.

Bone and Malt Mixture. E. and N. Seltzer. (*Proc. Amer. Pharm. Assoc.*, **52,** 247.) Powdered bone, 100; phosphoric acid, 100; lactic acid, 160; pepsin, 20; pancreatin, 5; water sufficient to make 2,000; malt extract, 2,000. Mix.

Cacao Butter, Behaviour of, with Certain Compounds. E. A. Ruddiman. (*Proc. Amer. Pharm. Assoc.*, **52,** 222.) Other compounds besides chloral hydrate soften cacao butter when rubbed with it. With one-half its weight of camphor, euphorin, menthol, naphthalin, thymol, or salol, oil of theobroma gives a soft mass or liquid. The addition of beeswax or of spermaceti is recommended, but, although these bodies raise the melting point, they do not render the consistence of the mass suitable for suppositories. Probably the addition of a little hardening agent and an absorbent powder may give the requisite firmness.

Cacao-butter Soap for Dentifrices. P. van der Wielen (*Pharm. Weekblad.*, through *Apoth. Zeit.*, **20,** 14.) From its agreeable taste and odour, cacao-butter soap is specially suitable for the preparation of tooth pastes and powders. It may be prepared as follows: 100 parts of melted cacao butter is added to a warm 50 per cent. solution of caustic soda, sp. gr. 1·54, well stirred, and allowed to stand for 48 hours. The mixture is then warmed on the water-bath until a clear solution results; 1,000 parts of water is then added and the soap salted out from the hot solution by the addition of 100 parts of salt. The mixture is boiled until the soap has completely separated; after cooling, the solid soap layer is removed, strongly pressed, washed with 50 parts of water, again pressed, broken up into small pieces, and dried at a gentle heat. When dry it is rubbed to a fine powder. The soap thus obtained is light yellow, has a slight odour of cacao, and gives a clear solution in water. It gives no alkaline reaction in solution with 90 per cent. alcohol, with phenolphthalein. Even when unmixed with other ingredients it forms a good tooth powder.

Caffeine, Hypodermic Injection of. F. Mendel. (*Merck's Report*, 18, 50.) The addition of sodium salicylate as a solvent of caffeine is stated to have no ill effects on the activity of the latter, and obviates the discomfort and pain usually following the administration of caffeine injection. The injection is thus prescribed: Sodium salicylate, 17·5; caffeine, 2·5; distilled water to 100. The dose is 2 c.c. of this solution for adults, with correspondingly less for children.

Calomelol Ointment and Dusting Powder. (*Merck's Report*, 18, 114, and *Apoth. Zeit.*, 19, 1002.) Calomelol is described as colloidal mercurous chloride containing 25 per cent of albuminoids. It is soluble in about 50 parts of water, and also in saline solutions.

A dusting powder for syphylitic sores consists of calomelol, 2; zinc oxide, 1; starch, 1. *Calomelol Ointment*, known as "Heyden's Ointment," is a soft, greyish-white preparation, containing 45 per cent. of calomelol. It is intended for mercurial treatment by inunction, injection, or simple application. The activity of the ointment is increased by the addition of 2 per cent. of killed mercury, and the later calomelol ointment of commerce contains the addition. The daily dose is up to 95 grains.

Camphor Liniment, Preparation of. A. Boyd. (*Pharm. Journ.* [4], 20, 266.) Measure the oil into a bottle with a fairly wide neck, and dipping it into hot water and shaking occasionally. When fairly warm introduce the camphor, first put through a No. 20 sieve to break up all masses; cork up tight, and shake vigorously, when it will all dissolve. Made this way, there should be no loss of camphor.

The stock of camphorated oil should be kept well stoppered, and in the coolest part of the shop—the cellar preferably. The shop bottle, used for sales, should be kept on a low shelf, and away from direct sunlight. To test the preparation at any time, weigh 100 grs. into a small dish and evaporate with the heat of the water-bath, when it should lose in weight 21·44 grs., which represents the camphor; if it falls under 21 grs., the original stock should be made up to the right strength by adding more camphor to the oil being tested.

Camphor Milk. M. I. Wilbert. (*Amer. Journ. Pharm.*, **77**, 130.) Alcoholic solution of ammonia (10 per cent.), 5; oleic acid, 10; cotton-seed oil, 20; camphor, 1; water to make 150. To the cotton-seed oil, in a dry bottle, add the oleic acid, followed by the alcoholic ammonia; in this mixture dissolve the camphor. Then add the water in quantities of 5 to 10 fluid parts at a time, and shake or stir until a uniform smooth emulsion has been obtained. Any other perfume may be substituted, as desired, for the camphor, and mineral oil or oil of sweet almonds used instead of cotton-seed oil.

Camphor Snow. M. I. Wilbert. (*Amer. Journ. Pharm.*, **77**, 128.) Agar-agar, 3; water, 150; stearic acid, 15; sodium carbonate, 10; cacao butter, 15; water, 100; alcohol 94 per cent., 10; camphor, 5. Dissolve the agar-agar in the water, 150, by heating, and strain. Add the stearic acid to 100 c.c. of water heated on the water bath, then the sodium carbonate. When effervescence ceases and all the gas has been driven off, add the cacao butter and the agar-agar mucilage; mix thoroughly with an egg whisk, remove from the water-bath, and continue the beating until a uniform lather results of about three times the volume of the original liquid.

Capsicum Counter-Irritant. F. E. Niece. (*Drug. Circ.*, **49**, 224.) Yellow petrolatum, 4 ozs.; capsicum powder, 1 oz. Digest on a sand bath for a few hours, let it stand, and while hot filter or strain. Pour into jars or tubes while still hot. An excellent counter-irritant for use as a substitute for mustard plaster which does not vesicate.

Capsicum Paraffin Liniment. F. E. Niece. (*Drugg. Circ.*, **49**, 223.) Paraffin oil, 8; powdered capsicums, 1. Digest on a sand-bath and filter. Camphor, oil of winter green, thymol, menthol, or any other soluble ingredient may be added. It is stated to be an excellent stimulating liniment for application where there are no exposed surfaces.

Catgut, Sterilization of, by Means of Benzol. — Beslier. (*Journ. Pharm. Chim.*, **21**, 497.) The catgut, wound on glass reels, is placed in a copper bomb containing pure crystallizable benzol. The bomb is closed with a screw cap, placed in an autoclave and boiled for 20 to 25 minutes. The reels are then withdrawn and placed in open flasks, which are immersed in a fresh bath of benzol in another screw-capped bomb. This is then heated in the autoclave to a pressure of 2 atmospheres, when the temperature is allowed to fall slowly, the process taking from 75 to 90 minutes. The screw-cap is then removed and replaced by a plug of cotton wool, through which a syphon is passed. The greater part of the benzol is syphoned off and the rest evaporated on the water-bath, without removing the plug of cotton. When all the benzol has been driven off, alcohol 70 per cent. is syphoned into the bomb, in which the catgut recovers its pliability. The flasks containing the reels are then taken out with sterilized pliers and corked. The breaking strain of the catgut is unaffected by this process.

Charta sinapis. A. W. Gerrard. (*Pharm. Journ.* [4], **19,** 805.) After criticizing official and published formula for this preparation, the following improvements in detail and manipulation are suggested. Take equal parts of black and white mustard, deprived of its fixed oil, in No. 60 powder, 1 part; solution of india-rubber in benzol (1 in 40), 4 fluid parts. Mix well until uniform. Spread the mixture evenly over suitable paper in a thin layer, either by means of a plaster-spreading machine or by passing the paper over the mixture contained in a shallow vessel. Expose in a warm place for a short time to dry. Preserve the paper in well-closed tins or boxes.

Mustard paper must not be long exposed to light or air in the drying process, as it is found by so doing the mustard bleaches and the india-rubber perishes. Beyond this, mustard paper is hygroscopic, so that if hung too long in a moist atmosphere it is easily ruined. For these reasons it must be dried quickly, and preserved securely from light and air.

Chaulmoogra Oil, Pharmacy of. (*Pharm. Centralh.*, 1904, **45,** 633.) *Spirit of Chaulmoogra.*—Alcohol (90 per cent.), 3; chaulmoogra oil, 4. Mix. *Ointment of Chaulmoogra.*—Chaulmoogra oil, 2; vaseline, 5; hard paraffin, 1. Melt together. *Liniment of Chaulmoogra.*—Chaulmoogra oil, 20; methyl salicylate, 10, or chaulmoogra oil, 30; alcohol (90 per cent.), 4. *Plaster of Chaulmoogra.*—Lead plaster, 2; yellow wax, 1; chaulmoogra oil, 1. *Pills of Gynocardic Acid.*—Gynocardic acid, 1; gentian extract, 3; hop extract, 3.

Cherry Laurel Water and Alkaloidal Solutions, Incompatibility of. — Barillé. (*Journ. Pharm. Chim.* [6], **21**, 337.) The use of cherry laurel water with alkaloidal salts in solution, such as hypodermic injections, in which it is often prescribed on the Continent, should be abandoned. It is found that, unless quite freshly prepared, it occasions a precipitate with most alkaloids. The substance causing this precipitate has not been isolated; it is not HCN, and is not present in freshly distilled cherry laurel water, but is gradually formed under the influence of air and light. Hypodermic injections, which have been sterilized by heating in the autoclave, require no addition to keep them, so that the addition of cherry laurel water is quite unnecessary. Another objection to its use is that injections containing it are invariably more painful than those in which it is not an ingredient. The reaction noted between cherry laurel water which has been kept, and certain alkaloids, specially cocaine, is so definite that these bases may be employed as reagents to determine if the water has been recently distilled. (See also *Year-Book*, **1891**, 264.)

Chrysarobin, Compound Ointment of, for Psoriasis. Dreuw. (*Merck's Report*, **18**, 48.) Chrysarobin. Ol. rusci. āā, 300; acid. salicyl., 150; Sapo mollis, vaselini āā, 375. To be applied with a shaving brush, night and morning.

Cinchona Alkaloids, Behaviour of, with Solutions of Ammonium Acetate and Citrate. A. B. Lyons. (*Pharm. Review*, **22**, 365, through *Journ. Pharm. Chim.* [6], **21**, 65.) *Solution of Ammonium Acetate.* A 2 per cent. aqueous solution of quinine sulphate, the salt being dissolved by means of 5 per cent. by volume of H_2SO_4, 5 per cent. was employed. One c.c. of strong solution of ammonium acetate gave with 1 c.c. of this solution an almost immediate formation of crystals, and also with the same ammonia solution previously diluted with 1 c.c. of water. The precipitate formed dissolves at once in 1 c.c. of alcohol. Under similar conditions cinchonidine sulphate solution only forms a few crystals after energetic agitation; more rapid crystallization results with 2 c.c. of the ammonia solution. Quinidine and cinchonine sulphates give no crystals. These results show the important part played by alcohol in certain elixirs, in preventing the precipitation of the quinine.

Ammonium Citrate. The ammonium citrate solution used contained 10 per cent. of the salt, with a slight excess of acid. One c.c. of it was previously mixed with 1, 3, 5 and 8 c.c. of water. With the first of these solutions 1 c.c. of the quinine sulphate solution gave an immediate abundant precipitate, which 1 c.c. of alcohol only partially, but 2 c.c. completely, redissolved. With the second dilution, the precipitate formed more slowly. The dilution with 5 c.c. of water formed crystals only after vigorous agitation, and the addition of alcohol rendered it almost clear. The dilution with 8 c.c. of water only gave a precipitate after prolonged agitation; but on standing the amount formed was considerable. The other cinchona alkaloids showed no incompatibility with ammonium citrate, except cinchonidine, which slowly formed a crystalline precipitate, which was readily dissolved by 1 c.c. of alcohol. These results show that a marked incompatibility exists between quinine sulphate and alkaline citrate, and that this is evident in the presence of a notable quantity of alcohol.

It was noted that the fluorescence of any acid solution of quinine was destroyed by adding the solution of any salt.

Cinchona Extracts, Incompatibility of, with Antipyretics.—Robert. (*Bull. Pharm. du Sud. Est.*, through *Répertoire*, **60,** 440.) Antipyrine, pyramidon and its camphorate, exalgine and kairine all give unsightly precipitates with extracts of cinchona. This precipitate is soluble in alcohol, in glycerin, in organic acids such as citric and tartaric acids, and in HCl. It is caused by the tannin present in the extract; with preparations containing but little astringent matter, such as Huanaco bark, it is scarcely evident. When it occurs, it should not be filtered out; if it be but slight, it may be redissolved with a little alcohol, glycerin or citric acid.

Cinchona, Liquid Extract of. Elsie S. Hooper. (*Pharm. Journ.* [4], **19,** 324.) The adoption of Wobbe's method is advocated in preference to the present official process.

200 Gm. of the bark were moistened with 100 Gm. of a mixture of glycerin 50 Gm.; alcohol 90 per cent., 50 Gm.; HCl 25 per cent., 15 Gm.; water, 35 Gm., and allowed to stand overnight; the drug, which had become very lumpy, was passed through a coarse sieve and packed in a percolator; 70 per cent. alcohol was then added in portions of 30 c.c. every two hours until the whole column of drug was moistened; a reservoir of

alcohol was then inverted over the top of the percolator, and percolation allowed to proceed slowly. The first 130 c.c. of percolate was reserved, and percolation continued until the drug was exhausted, when 5 c.c. of the weak percolate gave no precipitate after evaporating off the alcohol, acidulating, filtering if necessary, and adding Mayer's reagent. Exhaustion was reached when 2,500 c.c. of percolate had been collected. The weak percolates were distilled under reduced pressure, the residue evaporated to 70 c.c. and added to the reserve, making 200 c.c. in all. The resulting liquid extract was then assayed.

Assay of the Liquid Extract. 5 c.c. of the liquid extract were diluted with 15 c.c. of water ; 5 c.c. of NaOH, 10 per cent., and 20 c.c. of benzolated amylic alcohol were added, and the whole well shaken in a separator ; the alcoholic solution was separated, washed, and the washings added to the original solution, which was again shaken out. This process was repeated five times. The united alcoholic solutions were then shaken out five times with 15 c.c. of dilute HCl, and the alkaloid finally transferred from these acidulated solutions to chloroform, the chloroform evaporated off, and the residue weighed. No emulsions were produced during the assays, and the liquids separated easily the one from the other. The results of two assays were :—(*a*) 5·26 per cent., (*b*) 5·28 per cent. As the bark contained 5·6 per cent. of alkaloid, the loss of alkaloid in the extraction amounts to about 6 per cent. of the whole, which is small compared with the loss when this preparation is made by other methods.

This method for the preparation of liquid extract of cinchona appears to be superior to the official method in the following respects :—Practically the whole of the alkaloid is removed from the bark. The length of time required for the percolation is shorter, and the quantity of menstruum used is much less. The liquid extract is rich in constituents of the bark other than alkaloids. It possesses, in common with other processes based on a similar method of extraction, the disadvantage of precipitating considerably when mixed with water, and it yet remains to be seen whether it will keep well.

Citrate of Iron and Quinine in Mixtures. H. Wyatt. (*Pharm. Journ.* [4], **19,** 899.) These mixtures form a troublesome class, where incompatibles are prescribed with the scale preparation :—Ferri et quin. cit., ʒj ; liq. strych., ʒj ; ac. phosph.

dil., ʒiss ; syr. zingib., ʒiij ; spt. chlorof., ʒij ; aq. menth. pip., ad ℥vj. M. ft. mist.

Dilute the acid with half the aq. menth. pip. and add the other ingredients dissolved and mixed with the remainder of that menstruum.

When the acid is added to the scale compound only slightly diluted a white precipitate of ferric phosphate comes down.

Ferri et quin. cit., ʒj ; syr. aurant, ℥j ; spt. chlorof., ʒij ; dec. aloes co., ad ℥vj. M. ft. mist.

The precipitate which one would expect in this mixture is so finely divided, and so well suspended by the myrrh and aloin soaps in the decoction, that it gives no trouble and is not noticeable.

Ext. cocæ liq., ℥ij ; ferri et quin. cit., ʒiij ; tr. gent. co., ℥iss ; tr. nucis vom., min. 300 ; aquæ, ℥ss. M. ft. mist.

Instead of the tincture of nux vomica an equivalent amount of the liq. extract was employed to avoid the excess of alcohol precipitating the ferri et quin. cit.

Spt. ammon. arom., ♏. 120 ; ferri et quin. cit., ♏. 24 ; aq. menth. pip., ad ℥vj. M. ft. mist.

With the consent of the prescriber a fluid ounce of infusion of senega was used in this to suspend the precipitate, the patient objecting to a thick gummy or sweet mixture.

Cold Cream, A New Formula for. M. D. Hodges. (*Amer. Drugg.*, **45,** 42.) To prepare a light cold cream success lies in two essentials, viz. : a good egg-beater and plenty of elbow grease. Liquid albolene or white (odourless) paraffin oil, 16 fl. oz. ; paraffin, ℥iv ; white wax, ℥ij ; perfume to suit.

Melt the paraffin and white wax on a water-bath, then remove from the fire and add the liquid albolene, beating the mixture briskly until nearly cold. Add perfume and transfer to suitable jars. Generally oil of rose or oil of rose geranium are most suitable.

Compound Mixture of Chloral and Potassium Bromide. W. F. Jackman. (*Proc. Amer. Pharm. Assoc.*, **52,** 148.) Chloral, 25 Gm. ; potassium bromide, 25 Gm. ; extract of Indian hemp, 0·2 Gm. ; extract of hyoscyamus, 0·2 Gm. ; clarified honey, 60 c.c. ; water to make 100 c.c. Triturate the chloral and the extracts with sufficient honey to form a solution ; dissolve the bromide in the water, add the remainder of the honey and then the chloral solution. Adjust to 100 c.c. with water. The above is similar to the N.F. formula, substituting honey for the tincture of quillaia therein prescribed.

Compound Tincture of Cardamoms. E. W. Lucas and H. B. Stevens. (*Chem. and Drugg.*, **66,** 490.) The presence of raisins in this tincture is regarded as unnecessary and to be the cause of the varying character of the commercial preparation. The following formula is suggested: Cardamom seeds, bruised, ¼ oz.; caraway fruit, bruised, ¼ oz.; cinnamon bark, bruised, ½ oz.; cochineal, in powder, 55 grs.; glycerin, 1 fl. oz.; alcohol, 60 per cent., q.s.

Macerate the cardamoms, caraways, cinnamon, and cochineal in 18 fl. oz. of the alcohol. Press, filter, and make up to one pint with the menstruum.

A standard sample of the tincture, strictly following the official ingredients and directions, was compared with commercial specimens as shown in the following table:—

No.	Sp. Gr. at 60°F.	Extractive dried at 212°F.	Alcohol (vol.).	Colour.	Polarimeter Readings.	
					Direct	Invert.
A	0·9495	6·43	54·10	1·4	−2·4	unchanged
B	0·947	5·36	53·70	1·4	−2·6	”
C	0·945	5·85	55·75	1·8	−2·6	”
D	0·950	6·85	51·50	1·0	−2·4	”
E	0·9485	6·70	53·70	1·5	−2·4	”
F	0·9545	6·72	51·50	1·4	−2·2	”
G	0·9395	5·77	56·58	1·0	+19·4	−3·9
H	0·948	6·58	55·50	1·9	−2·6	unchanged
I	0·945	6·23	53·70	1·2	−2·4	”
Standard Sample	0·949	6·95	55·1	—	−2·4	”

The abnormal polarimetric readings given by sample "G" can only be explained by the presence of cane sugar, probably added as a substitute for the raisins.

Confection of Senna. W. H. Lenton. (*Pharm. Journ.* [4], **20,** 650.) In order to avoid grittiness, the substitution of oil of coriander for the powdered fruits is recommended. The last portion of the official monograph might, with advantage, be slightly modified. The directions are to adjust the final "weight to 75 oz." irrespective of consistence. It would be preferable to produce a conserve of the right consistence, and then work in as much senna in fine powder as will give a confection containing one part in eleven, to keep it approximately the same strength as at present. It is impossible to give exact details as to weight or consistence, as varying products are obtained according to the conditions and quality of the fruits used; but to the practical pharmacist this will present no difficulty whatever.

Conium Ointment. W. H. Lenton. (*Pharm. Journ.* [4], **20,** 652.) A better ointment than that given by the official formula is obtained by the following method: Conium juice, 2 fl. oz.; wool fat (anhydrous), ½ oz.

Evaporate the conium juice to ½ oz. by weight and incorporate with the wool fat in a slightly warmed mortar. This yields an elegant and satisfactory ointment.

Copaiba Mixtures, Manipulation of. H. Wyatt. (*Pharm. Journ.* [4], **19.** 899.) The order of mixing causes a marked variation in the following case:—Copaibæ, ʒiv; liq. potassæ, ʒiij; succi hyoscyam., ʒiv; mucil. tragac., ℥j; syr. aurant, ʒvj; aq. chlorof., ad ℥vj. M. ft. mist.

Make the mucilage in the bottle, add half the chloroform water, and shake with the copaiba until emulsified, then add the other ingredients, make up, and finally add the liq. potassæ. This gives a fine, even, white emulsion.

If the liq. potassæ be added to the copaiba the emulsion is not so good, and is yellower in colour.

Copper Citrate, or Cuprocitrol Rods for Ophthalmic Use. Virotow. (*Merck's Report,* **18,** 52.) Copper citrate, 20; powdered acacia, 5; starch, 20; dextrin, 35; sugar, 20; distilled water and glycerin sufficient to mass. Mass and roll into rods. Copper citrate is also employed as a 5 or 10 per cent. powder, with sugar as the diluent; or as 5 or 20 per cent. ointment or a weak 1 : 9000 aqueous solution as a lotion.

Creosotal Pills, Massing with Glycerin. (*Pharm. Centralh.,* **46,** 230.) It has been noticed that when glycerin is added to the crumbly mass produced by mixing creosotal with licorice extract and powdered licorice, and the mass is worked, a strong acetous pyroligneous odour is developed; on standing, the consistence of the mass, instead of improving, becomes worse, sweating an oily inflammable substance. Experiments showed that creosotal undergoes decomposition when mixed with powdered licorice extract alone. It is found that when creosotal or creosote are intimately mixed with the proper proportion of glycerin first, and then massed with powdered licorice, a good pilular consistence is attained and the pills keep well. When the other order of mixing is followed, the particles of licorice powder become coated with creosotal or creosote, and resist the even penetration of the glycerin.

Creosote Wine. L. Grimbert. (*Journ. Pharm. Chim.*, **20,** 156.) The following formula has been submitted for inclusion in the new Codex : Creosote, 10 ; alcohol 90 per cent., 90 ; simple syrup, 100 ; Malaga wine, 800 parts by weight. Mix. Twenty Gm. of the wine contains 20 Cgm. of creosote.

Delphinium Seeds, Tincture of. H. M. O'Neil. (*Proc. Amer. Pharm. Assoc.*, **52,** 251.) Delphinium seeds, 100 Gm. ; potassium carbonate, 10 Gm. ; alcohol 91 per cent., 500 c.c. ; water to make 1,000 c.c. Mix the seeds with 500 c.c. of water, add the potassium carbonate and boil for 5 minutes. When cold, add the alcohol, mix and strain, passing sufficient water through the strainer to make up to 1,000 c.c. If requisite, filter through paper. The tincture thus prepared is stated to be superior for killing pediculi to that obtained with strong alcohol, in addition to being more economical and more rapidly prepared.

Elixir of Carica papaya ; Elixir of Papain. W. C. Kirchgessner. (*Proc. Amer. Pharm. Assoc.*, **52,** 213.) Solution of potash (5 per cent. KOH), 5·5 c.c. ; alcohol 91 per cent., 120 c.c. ; simple syrup, 120 c.c. ; papaw juice, 17 c.c. ; compound spirit of orange, 6 c.c. ; water, 240 c.c. Mix the alcohol, spirit and syrup. Dissolve the papaw juice in hot, not boiling, water, to which the solution of potash has been added. When cool, mix with the alcoholic solution. *Dose,* 4 c.c. This preparation is superior to pepsin, since it is equally active in alkaline solution, and to pancreatin, since it is also effective in an acid medium. The papaw juice used is the commercial West Indian product.

Endermol. (*Apoth. Zeit.*, **20,** 75.) Endermol, which should be distinguished from eudermol (*Year-Books*, **1899,** 225 ; **1902,**

193), is a new ointment basis composed of a mixture of paraffin hydrocarbons and stearic acid. It forms a non-viscous white mass, of the consistence of lard, perfectly neutral, and melting at 78–80°C. It does not become rancid, will combine with 15 per cent. of water, and is stated to be readily absorbed by the skin.

Ergot, Acid Tincture of. L. Sternberg. (*Pharm. Centralh.*, **45**, 872.) Freshly powdered ergot, 10, is macerated with warm water, 80, for 24 hours in a closed vessel, with frequent shaking; dilute hydrochloric acid, 2, and alcohol (96 per cent.), 20, are added, and the mixture allowed to macerate for another 24 hours. After straining, the liquid is made up to 100 with water, and filtered. The product should be kept from the light. Maximum dose, 155 grs.

Ergot, Extract of; Formula for the New French Codex. (International Formula.) L. Grimbert. (*Journ. Pharm. Chim.* [6], **20**, 209.) Ground ergot, 1 kilo.; distilled water, 5 litres; alcohol 95 per cent., 500 Gm. Place the ergot in a percolator with 2 litres of water and allow to macerate for 12 hours. Then percolate and continue the extraction with the rest of the water. Evaporate the aqueous liquid in a tared dish on the water-bath until the weight reaches 500 Gm.; cool, transfer to a bottle, and add the alcohol; shake well and set aside for 24 hours, filter and evaporate to a soft extract. *Characters.*—A reddish-brown extract with the odour of roast meat, giving a clear, acid solution with water. When this solution is rendered alkaline with NaOH and warmed, it gives off vapours which give a blue colour to red litmus-paper, and which have the odour of methylamine. When acidified with HCl it gives a precipitate with potassium mercuric iodide reagent.

Ergot, Liquid Extract of; Formula of the New French Codex. L. Grimbert. (*Journ. Pharm. Chim.* [6], **20**, 210.) Crushed ergot, 1 kilo.; cherry-laurel water, 300 Gm.; alcohol 95 per cent., 500 Gm.; tartaric acid, 1 Gm.; calcium carbonate, 2 Gm.; salicylic acid, 1·5 Gm.; distilled water, q.s. Dissolve the tartaric acid in 2 litres of distilled water. Moisten the ergot therewith, place in a percolator and set aside for 12 hours, then percolate and continue the extraction with another 3 litres of water. Evaporate the aqueous percolate in a tared dish on the water bath to 500 Gm.; cool and transfer to a bottle. Add the calcium carbonate and the alcohol; shake well and set aside for 24 hours. Filter and evaporate off the alcohol on the water bath at a low temperature. Transfer the residue to a tared vessel, add the cherry-laurel water, and sufficient distilled water to make the weight up to 1,000 Gm. Dissolve the salicylic acid in the product, and filter.

Eserinol, Oily Collyrium of Eserine for Ophthalmic Use. E. Wild-Borbeck. (*Pharm. Zeit.*, **50,** 399.) To obtain an oily preparation of eserine in olive oil, which is painless when instilled into the eye, the following process must be followed. Eserine, 20 Cgm., is rubbed down in a small mortar and dried at 100°; the dried alkaloid is then introduced into a small perfectly dry flask with 40 Gm. of olive oil, and thoroughly agitated to suspend it evenly in the oil. The oily mixture thus obtained is then heated to 150–158°C. At the higher temperature the alkaloid, after two or three shakings, enters into complete solution in about 20 minutes. The temperature should never exceed 160°C., or the alkaloid will be decomposed. The solution is then cooled, a slight opalescence appearing at about 30°C. It is then quickly cooled to 10°C. with constant and thorough agitation; a portion of the eserine separates out in minute crystals, but this does not interfere with the efficacy of the preparation. The 0·5 per cent. oily solution of eserine thus obtained is a cloudy liquid which must be well shaken up before use. It should be stored in small, amber-coloured, glass-stoppered bottles, which have been previously washed out with ether and scrupulously dried. The solution retains its physiological action unimpaired for months, and is absolutely sterile.

Euguform Paint. (*Merck's Report*, **18,** 66.) Joseph recommends the following paint for the treatment of strophulus infantum. Soluble euguform, 1; zinc oxide, 2; starch powder, 2; glycerin, 3; distilled water to make up to 10. To be well shaken and applied with a brush three times a day.

Euquinine in Mixtures. — Vidal. (*Répertoire* [3], **16,** 341.) Euquinine is sometimes prescribed in mixtures in a greater quantity than its solubility allows to be dispensed in perfect solution; a clear mixture may be obtained by using citric acid in the proportion of one-fourth of the weight of the euquinine ordered, or by using any acid fruit syrup as a sweetening agent.

Filling Two-part Gelatine Capsules with Liquids. H. P. Hynson. (*Proc. Amer. Pharm. Assoc.*, **52**, 196.) The following method of filling and sealing two-part gelatine capsules is suggested. The caps are placed, rim down, on filter paper saturated with water. The liquid is introduced into the shell of the capsule in such a manner that no portion touches the rim. The cap is then carefully laid on, and the capsule left standing upright for a few minutes, when a perfectly hermetic seal is secured.

Formalin Gauze and other Formalin Dressings. P. Zelis. (*Pharm. Zeit.*, **49**, 617.) Formalin, 75; alcohol (methylated), 1,300; glycerin, 125, are mixed and absorbent gauze, 1,200, is impregnated with the mixture. It is then spread out and dried in the dark at the ordinary temperature, until it no longer feels damp to the fingers. The antiseptic is then fixed by plunging the gauze into a solution of lanoline, 100, in benzol, 1,400, or in ether-alcohol; excess of the liquid is wrung out and the gauze dried in a well-ventilated chamber. It contains approximately 2 per cent. of formaldehyde.

Formalin cotton is prepared in a similar manner, absorbent cotton, 1,000, being impregnated with a mixture of alcohol (methylated), 1,600; glycerin, 60; and formalin, 35. This is fixed by immersion in a solution of lanoline, 60, in ether, 300. Castor oil may be used instead of lanolin as the fixing agent; it is then added to the first mixture in place of the glycerin prescribed above. Although the second dipping is thus avoided, the use of oil instead of lanoline is not to be recommended, for it turns rancid and acquires an unpleasant odour on keeping.

Frothing Powder to Facilitate the Taking of Nauseous Medicines. —Boissel. (*Bull. gén. de Thérap.*, **148**, 631.) Some time ago beer which carries a good head was recommended as a vehicle for the administration of castor oil. But beer is open to considerable objection, and is not an ideal vehicle for frequent use by young children. Equally satisfactory if not better results may be obtained by shaking up with water a powder containing gum acacia, liquorice, marshmallow, and milk sugar flavoured with vanilla, anise, or other aromatic flavour. A pinch of this is shaken up with a little water in a covered ointment pot, or beaten to a froth with a spoon. The froth produced is very persistent. By its aid the patient may take any nauseous or oily liquid without perceiving the taste. Sandal oil, castor oil, methyl salicylate, and similar liquids may be administered in this way.

Galbanum Pill, Compound. D. A. Young. (*Pharm. Journ.* [4], **19,** 852.) The official process of heating the gum resins is condemned, so is the use of glucose as an excipient. By using the official quantities of galbanum, asafetida and myrrh, powdering the last, and substituting kaolin for glucose, mixing this with the galbanum and asafetida before adding the powdered myrrh, and then working to a mass in the mortar, a satisfactory pill mass may be obtained, which will roll into pills which keep their shape. If a large mass has to be made, the mortar may be previously warmed.

Gelatine Ovules. L. Grimbert. (*Journ. Pharm. Chim.*, **20,** 157.) Soak washed and dried gelatin, 1, in water, 3, until the latter is completely absorbed ; warm glycerin, 6, and add the softened gelatin to it. When dissolved, strain through a cloth and run into moulds previously oiled with a very little vaseline oil. Undue heat should be avoided when dissolving the gelatin, or the basis loses its firm consistence. Substances soluble in water may be added to the liquid prescribed for softening the gelatin. The above method is that suggested for inclusion in the new Codex.

Gentian, Glycerinated Elixir of, N.F. (*Proc. Amer. Pharm. Assoc.*, **52,** 199.) The following new formula is suggested : Gentian in No. 50 powder, 10 ; taraxacum in No. 50 powder, 15 ; sugar, 200 parts ; acetic ether, 5 ; phosphoric acid, 5 ; tincture of fresh orange peel, 15 ; compound tincture of cardamoms, 60 ; solution of saccharin, 30 ; glycerin, 400 ; white wine sufficient to make 1,000 fluid parts Macerate the drugs and flavours with 350 fluid parts of wine for 3 days, with frequent shaking. Then filter and pass enough wine through the filter to make 600 c.c. of filtrate. To this add the glycerin.

Glass Bottles, Test for Neutrality of. — Baroni. (*Apoth. Zeit.*, **20,** 510.) Jena glass bottles of perfect neutrality are distinguished by a red band ; but bottles so marked are met with, of different make, which are not perfectly neutral. These bottles are not suitable for the storage of certain delicate pharmaceutical preparations, such as alkaloidal and mercurial injections, which have to be sterilized at 112°C., since, when used, they cause a precipitate of the active ingredient. Freedom from this harmful alkalinity may be ensured by submitting the bottles to the following tests: Solutions of morphine hydrochloride, 1 or 2 per cent., strychnine nitrate, 0·5 per cent., and of $HgCl_2$, 1 per cent., are placed in separate bottles to be tested, and heated to 112°C. under pressure in the autoclave for 30 minutes. If the glass be neutral, the solutions will be unaltered. But if a trace of alkali be dissolved the morphine solution becomes discoloured, and deposits crystals of morphine hydrate on the sides of the bottle; the same occurs with the strychnine solution; while the $HgCl_2$ solution will show a yellow or red precipitate of HgO. The importance of employing neutral bottles for storing these potent preparations cannot be too strongly emphasized.

Glycerin Jelly. M. I. Wilbert. (*Amer. Journ. Pharm.*, **77**, 129.) Irish moss, 15; distilled water to make 420; glycerite of boroglycerin, 80. Boil the Irish moss with sufficient water to make 420 fluid parts of jelly, and strain. While warm add the glycerite, and later, when nearly cold, any desired perfume. Agar-agar, gelatin, tragacanth, starch or quince seed may be substituted for the Irish moss, and the glycerite may be replaced, wholly or in part, by glycerin.

Glycerin of Lead Acetate. J. Lothian. (*Pharm. Journ.* [4], **20**.) The B.P. process for the above is unsatisfactory. The water which is evaporated in boiling the ingredients together is not directed to be replaced, as in the case of the strong solution of lead subacetate. The resulting fluid is therefore so viscid that it is not possible to filter it without a hot water funnel, besides, in the preparation of small quantities, where the loss by evaporation is proportionately greater, decomposition of the glycerin is apt to take place, with discoloration of the product. The following cold process is recommended as a substitute: Lead acetate, 25 Gm.; lead oxide (sifted), 17·5 Gm.; glycerin, 126 Gm.; distilled water, 60 c.c.

Rub the lead acetate and lead oxide with 5 c.c. of the distilled water into a paste, and allow to stand, with occasional trituration, for 12 hours, add the remainder of the water and the glycerin, and allow to stand, with frequent agitation, for 24 hours. Filter. The filtrate has a sp. gr. of approximately 1·33, and is concentrated on a water-bath to the sp. gr. 1·48.

(133 Gms. of the above filtrate placed in a tared dish and evaporated on a water-bath to 102 Gm., has approximately the sp. gr. 1·48.)

It will be seen from the table below that such a solution is almost as strong as that prepared by boiling. The filtrate is bright and comes through rapidly, and the glycerin is not subjected to a higher temperature than that of the water-bath.

GLYCERIN OF LEAD SUBACETATE.

Process.	Specific Gravity.	Total Pb	Each Gramme Yielded	
			Pb as $Pb(C_2H_3O_2)$	Pb as $Pb(OH)_2$
B.P. (water evaporated, replaced)	1·3415	0·1299	0·0673	0·0626
Cold, twenty-four-hours . . .	1·3309	0·1243	0·0634	0·0609

Above results are the mean of several determinations.

The method of determination adopted was that of Cowley and Catford (*Year-Book*, **1902,** 493).

Glycerin Suppositories, Development of Red Colour in. (*Pharm. Journ.* [4], **19,** 142.) The orange or rose-red tint which is sometimes observed to be produced in glycerin suppositories on long keeping, especially in warm climates, has been traced to a pigment formed by a chromogenic bacterium, *Micrococcus roseus.* They are non-pathogenic and harmless to life. They require an alkaline medium for their successful growth, and a somewhat lengthy time before the pigment formed becomes noticeable.

Glycerophosphates, Elixir N.F. (*Proc. Amer. Pharm. Assoc.,* **52,** 199.) Two formulæ have been suggested for this :—

Formula A. Sodium glycerophosphate (75 per cent.), 23·3 Gm.; calcium glycerophosphate, 8·75 Gm.; phosphoric acid, 8 Gm.; glycerin, 300 c.c.; aromatic elixir, 300 c.c.; distilled water sufficient to make 1,000 c.c. Dissolve the salts and acid in 300 c.c. of distilled water, add the glycerin and elixir and enough water to make up to 1,000 c.c.

Formula B. Sodium glycerophosphate (75 per cent.), 23·3 Gm.; calcium glycerophosphate, 8·75 Gm.; syrup, 100 c.c.; brandy, 100 c.c.; white wine, 200 c.c.; acetic ether, 2 c.c.; glycerin, 500 c.c.; phosphoric acid, 8 c.c.; distilled water sufficient to make 1,000 c.c. Mix and dissolve.

Guaiacum Lozenges for Tonsilitis. W. Zeuner. (*Therap. Monats.*, **18,** 659.) The following lozenges are prescribed with success for the treatment of tonsilitis: Guaiacum resin, 30 grs.; sugar, 30 grs.; to make 1 lozenge. One to be taken every 2 hours. They may be also prepared in the form of smaller pastilles, of which one may be sucked every half-hour. Not only are these lozenges useful for tonsilitis, but they form an excellent prophylactic for those predisposed to throat troubles, and are also useful voice lozenges.

Hydriodic Acid, Glycerole of. W. C. Kirchgessner. (*Proc. Amer. Pharm. Assoc.*, **52,** 227.) The following glycerole, containing 2 per cent. of HI, is claimed to be superior to the syrup of the same strength in keeping properties: Potassium iodide, 208 Gm.; potassium hypophosphite, 16 Gm.; tartaric acid, 192 Gm.; water, 240 c.c.; diluted alcohol, 48·6 per cent., q.s.; glycerin 50 per cent., q.s. Dissolve the potassium salts in the water; dissolve the acid in 400 c.c. of dilute alcohol, mix the two solutions, and stand the mixture on ice for 3 hours, with occasional agitation. Filter. Two volumes of the filtrate added to 14 volumes of 50 per cent. glycerin will give a 2 per cent. glycerole.

Hyoscyamus Extract of; Formula of the New French Codex. (International Formulary.) L. Grimbert. (*Journ. Pharm. Chim.* [6], **20,** 212.) The coarsely powdered hyoscyamus leaves are to be extracted with 70 per cent. alcohol, as described under "Extract of Belladonna" (p. 231). The assay of alkaloids is conducted in the manner there described, but using 20 c.c. of N/100 H_2SO_4 for the titration.

Hypodermic Injection of Iron. E. Baroni. (*Boll. Chim. farm.*, through *Nouveaux Remèdes*, **21,** 136.) Dissolve pure NaOH in a little water and dilute it until 10 c.c. of the solution exactly neutralizes 25 c.c. of N/H_2SO_4. Take 37·3 c.c. of this soda solution and add to it in a flask 19·6 Gm. of citric acid, 5·55 Gm. of very fine, pure iron wire, and 150 c.c. of water. Heat gently until reaction is complete. Filter the solution into a graduated 250 c.c. flask, and make up to that volume with boiled and cooled distilled water. Put up in suitable small bottles, sterilize, and seal. The solution is grass green in colour, rapidly becoming brown on exposure to air.

Hypophosphorous Acid, Uses of, in Dispensing. H. Wyatt. (*Pharm. Journ.* [4], **19,** 899.) There are many cases where a few drops of hypophosphorous acid will work wonders in the prevention of iodine liberation in certain mixtures, and prescribers will generally sanction its use.

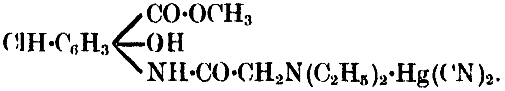
Where quinine, an acid, and iodide of potassium are prescribed together, decomposition will result, as in the following mixture: Quin. sulph., 36 grs.; acid hydrobrom. dil., ʒiv.; potass. iodid., ʒj.; tr. aurant, ʒvj.; Spt. chlorof., ʒiij.; aquæ, ad ℥vj. M. mist. ft.

By adding to this 24 drops of *Acid. Hypophosph.*, B.P.C., coloration is prevented entirely.

Where *Syr. ferri iodidi* has become coloured, as it will do, particularly in winter, when the actinic power of daylight is not sufficiently active to reduce the ferric oxyiodide gradually formed by the action of the air, warming gently, and dropping in sufficient hypophosphorous acid, will soon bring it back to its sea-green colour.

Ichthyol Compound Application for Anal Fissure. M. Katzenstein. (*Merck's Report*, **18,** 99.) Cocaine hydrochloride, 1; extract of belladonna, 10; ichthyol to 120. This mixture is introduced into the anus, near the fissure, whence the ichthyol permeates into all the mucous folds and into the fissure itself. It is claimed that the affection may be healed in 8 to 10 days by repeated use of the application.

Incompatibility of Nirvanine and Mercuric Cyanide. G. Denigès. (*Bull. Soc. Pharm. de Bordeaux*, **43,** 162.) A nasal douche, for which nirvanine, sodium chloride and mercuric cyanide were prescribed as an antiseptic, was found to throw out a crystalline deposit. This was found to be a crystalline double salt—



$$ClH\cdot C_6H_3\left\langle\begin{matrix}CO\cdot OCH_3\\ OH\\ NH\cdot CO\cdot CH_2N(C_2H_5)_2\cdot Hg(CN)_2.\end{matrix}\right.$$

The compound results when strong aqueous solutions of nirvanine and mercuric cyanide are mixed, but the presence of NaCl favours its formation in more dilute solutions. With 1 Gm. of nirvanine and salt, dissolved in 5 c.c. of water, 0·20 Gm. of mercuric cyanide dissolved in a similar quantity of water and mixed, gives a crystalline precipitate in an hour. With 10 per cent. solution of the two compounds, the crystalline precipitate is formed at once. The crystals are stable, and do not lose weight when dried at 100°C. They are readily soluble in warm water, but only to the extent of about 1 : 100 in cold. The formation of the crystalline compound is sufficiently delicate in the presence of sodium chloride solution to serve as a microchemical reaction for the detection, on the one hand, of nirvanine, on the other, of mercuric cyanide. In the first case a reagent of mercuric cyanide and sodium chloride may be employed; in the second, one of nirvanine and sodium chloride.

Infusions, Aseptic. A. Currie. (*Pharm. Journ.* [4], **20,** 584.) Take bottles of convenient size (8 oz. upright sterilizing feeding bottles answer admirably), rinse with a mixture of 1 part of nitric acid and 3 parts of sulphuric acid, so as to destroy all highly resistant spores, then wash with sterile or boiled water. Then fill up to the shoulder with the filtered fresh infusion, plug the neck with cotton-wool, and place over it a single-hole teat. Place the bottles so prepared and filled in a steamer (a large-sized potato steamer serves well), and steam at 100°C. for 15 minutes; allow to cool, and next day again steam for 15 minutes. The object of the double sterilization at an interval of 24 hours is that any resistant spores which may not be killed by the first may have time to develop into bacteria or mould, and may then be easily killed by the second sterilization. The teat over the bottle prevents undue evaporation, while allowing of the equalization of pressure. So treated, infusions will keep indefinitely, and if tested at intervals will be found completely sterile. The aroma and flavour are indistinguishable from a recently prepared infusion if they be kept in the dark, and therapeutic properties are not impaired. If it be necessary to use part of the contents of a bottle when dispensing, all that is necessary is to pass the plug of cotton-wool through the flame to sterilize it, remove with the left hand, pour out what is desired, avoiding contact with the vessel into which it is being poured, and replace the plug and cap.

The objection to White's method (*Year-Book*, **1894,** 202) is the placing of the sterile plug of wool in the bottle after sterilizing, thereby increasing the risk of infection. It is also unnecessary to sterilize infusions of quassia and calumba in the cold by filtration, as they show no alteration on heating, if removed from the drug. Quassia, calumba, buchu, gentian, senna, and senega infusions sterilized by above process, all over three months old, have kept perfectly.

Infusions, Concentrated. H. Deane. (*Pharm. Journ.* [4], **20,** 435.) Many chemists who have had occasion to use "concentrated infusions" have noticed that, when diluted so as to be "equivalent to the B.P. infusion," the products of different firms are very different in colour. The following figures, obtained from the examination of samples made by five manufacturers, show that there is a correspondingly large difference in the amount of solid residue. In each case 1 fluid part of the concentrated preparation when diluted with 7 fluid parts of water was stated to represent the official infusion. The figures given for "residue" represent the weight of solid residue left on the evaporation of 100 c.c. to dryness on a water-bath. The figures given for alcohol show the percentage of absolute alcohol by volume. The figures in column 6 represent 8 times the residue found by Bascombe (*P.J.*, **62,** 228; *P.J.* [4], **8,** 228) to be present in samples of infusion prepared in the official manner :—

INFUSUM CALUMBÆ.

—	1	2	3.	4	5	6
Specific Gravity . .	0·974	0·985	0·989	1·011	0·989	—
Residue	2·96	2·37	3·61	10·35	3·42	4·79
Alcohol	22·09	20·71	23·19	19·18	22·30	—

The residue in Sample No. 4 appeared to consist largely of glycerin.

INFUSUM GENTIANÆ COMPOSITUM.

—	1.	2.	3.	4.	5.	6.
Specific Gravity . .	0·986	1·005	1·050	0·997	0·987	—
Residue	2·57	6·86	6·06	5·30	8·67	8·64
Alcohol	19·87	19·18	15·12	19·96	19·7	—

INFUSUM QUASSIÆ.

—	1	2	3.	4.	5.	6
Specific Gravity . .	0·973	0·981	0·973	0·980	0·978	—
Residue	0·332	0·896	0·264	0·328	0·480	0·376
Alcohol	20·43	19·59	24·08	18·03	20·24	—

INFUSUM SENEGÆ.

—	1	2	3	4	5	6.
Specific Gravity . .	1·006	0·993	1·010	1·090	—	—
Residue	9·76	3·62	10·46	8·82	—	12·48
Alcohol	24·98	20·24	22·73	20·06	—	—

INFUSUM SENNÆ.

—	1	2	3	4.	5.	6.
Specific Gravity . .	1·034	1·013	1·046	1·053	1·176	—
Residue	14·30	7·37	14·58	17·86	10·09	27·84
Alcohol	20·43	15·58	20·99	19·87	20·71	—

DECOCTUM SCOPARII.

Although this preparation has been replaced in the 1898 Pharmacopœia by an infusion of the same strength (1 to 20), prepared from the bruised instead of the whole root, doctors more frequently prescribe the decoction, and therefore this was examined; but probably Inf. Scoparii Conc. and Dec. Scoparii Conc. come out of the same bottle.

—	1	2	3	4.	5	6.
Specific Gravity . .	0·990	0·990	1·010	0·990	0·996	—
Residue	3·95	3·71	8·00	3·71	3·02	2·01[1]
Alcohol	21·29	22·55	19·87	21·59	14·64	—

The general conclusion to be drawn from these figures is that, as may be expected, the soluble matter in the drug is not, as a rule, extracted by the small quantity of liquid used in making the concentrated preparation as completely as by the quantity used in making the official preparation. Also that there is a greater difference between the products of different manufacturers than can be explained by the use of varying samples of drug, so that there must be considerable differences in the mode of manufacture, and presumably in whatever therapeutic value these preparations have.

---

[1] This is taken from a paper by Martindale (*P.J.*, **55,** 416). His figure for the infusion from the bruised drug is 4·6, while Bascombe's is 4·2.

Infusions, Concentrated. G. E. Pearson. (*Pharm. Journ.* [4], **20, 474.**) The inference drawn by Deane (*supra*) that the low yield of extractive in these preparations is due to inefficient extraction is controverted. The less amount is attributed to the precipitation of inert albuminous matter by the alcoholic menstruum employed.

The results of examination of commercial specimens of these preparations is given below :—

—	Sp. Gr. at 15°	Extractive Gm. per 100 c c. Dried at 100°.	Alcohol per cent. by Vol.
Inf. Aurant Conc. (1)	1·012	8·63	20·2
,, ,, ,, (2)	1·003	6·59	23·5
Inf. Buchu Conc. (1)	0·991	3·56	21·5
,, ,, ,, (2)	0·9985	5·44	22·6
Inf. Calumb. Conc. (1)	0·9985	4·76	22·6
,, ,, ,, (2)	0·993	3·62	16·5
,, ,, ,, (3)	0·994	4·16	22·6
,, ,, ,, (4)	0·990	3·10	22·6
Inf. Caryoph. Conc. (1)	0·9905	3·43	—
,, ,, ,, (2)	0·990	3·36	—
Inf. Cascarillæ Conc. (1)	0·995	3·83	—
,, ,, ,, (2)	0·9905	3·54	—
Inf. Digitalis Conc. (1)	0·980	1·28	24·9
,, ,, ,, (2)	0·983	1·74	24·0
Inf. Gentian. Co. Conc. (1)	1·006	7·97	22·3
,, ,, ,, (2)	0·992	4·50	23·1
,, ,, ,, (3)	1·001	5·68	18·4
,, ,, ,, (4)	1·010	8·68	21·7
Inf. Rhei Conc. (1)	1·023	11·80	22·5
,, ,, ,, (2)	0·999	5·40	21·4
,, ,, ,, (3)	1·026	11·99	20·2
,, ,, ,, (4)	1·032	13·03	20·1
Inf. Scoparii Conc. (1)	0·998	4·44	21·2
,, ,, ,, (2)	1·013	7·80	19·7
Inf. Senegæ Conc. (1)	1·003	6·99	22·3
,, ,, ,, (2)	1·007	8·90	—
,, ,, ,, (3)	1·012	10·37	—
Inf. Sennæ Conc. (1)	1·028	12 34	22·6
,, ,, ,, (2)	1·023	10·99	23·1
,, ,, ,, (3)	1·030	12·75	21·4
Inf. Uvæ Ursi Conc.	1·030	14·50	19·0

Insoluble Powders in Mixtures, Manipulation of. H. Wyatt. (*Pharm. Journ.* [4], **19,** 899.) *Bismuth Salts.* With bismuth subnitrate, mucilage is better mixed in the bottle with half the menstruum, and the bismuth levigated with the rest of the menstruum, a small amount at a time, and poured into the mucilage.

Bismuth Carbonate does not really require mucilage to suspend it, if it be kept freshly precipitated under water in the proportion of 60 grs. to the fluid oz.

Bismuth Salicylate is best compounded by rubbing fine in a mortar, moistening with the tinctures so as to drive out the air its particles contain, mixing with the water and then pouring into the bottle on to the mucilage.

Magnesiæ Carb. and *Magnesia* make much smoother mixtures if rubbed through a muslin strainer in a thin cream. This applies to nearly all insoluble powders, for the amount of foreign bodies, sieve-hairs, etc., removed from them when they are strained is rather surprising.

Boric Acid, though not exactly an insoluble body, gives some trouble when in fairly large amounts, owing to its tendency to float on the liquid. This can always be prevented by damping it with the tinctures before adding the water.

Salts in excess of solubility give frequent trouble, the greatest sinner in this respect being potassium chlorate. This would not be so if prescribers had the advantages of sodium chlorate pointed out to them. Its solubility is such that it should commend itself on that score alone, not to mention that its percentage of the chlorate radical is considerably higher than in the potassium salt.

Iodoform Gauze, Assay of. L. Grimbert. (*Journ. Pharm. Chim.* [6], **20,** 252.) No method of manufacture will be given in the new French Codex for the preparation of iodoform gauze ; it will be required to contain 10 per cent. of iodoform when assayed by the following method, which is due to François : About 20 Gm. of the gauze is weighed off and extracted with ether in a small extraction tube. The ethereal extract is then made up to exactly 100 c.c. ; 10 c.c. of this is placed in a 250 c.c. conical flask, and the solvent evaporated by a current of dry air. The residue is then treated with 10 c.c. of 1 : 5 $AgNO_3$ solution. The flask is then placed on a cold water-bath, and heat applied so that the temperature is slowly raised, then boiled for an hour; the flask in then filled up with distilled water, allowed to stand for 24 hours, and the AgI collected on a tared filter; it is then dried at 100°C., washed with ether, again dried at 100°C. and weighed. The weight obtained $\times 0{\cdot}559 \times 50$ will give the percentage of iodoform in the gauze.

Iodotannic Syrup. L. Grimbert. (*Journ. Pharm. Chim.* [6], **20,** 156, and [6], **21,** 437.) Iodine, 2; tannin, 4; syrup of rhatany, 100; simple syrup, 880 parts by weight. Dissolve the iodine and the tannin in 60 c.c. of distilled water on the water-bath; cool and filter. Mix the filtrate with the syrup of rhatany in a tared dish and evaporate to 120 Gm. Add the simple syrup, and mix. Twenty Gm. of this syrup is equivalent to 0·04 Gm. of iodine.

In consequence of the unfavourable criticism of this formula, it was subsequently modified as follows: Iodine, 2; tannin, 4; distilled water, 360; white sugar, 640. Powder the iodine and introduce it with the water and tannin into a glass or earthenware vessel. Warm on the water-bath to about 60°C. with occasional agitation until the solution gives no blue colour with starch paper. Then dissolve the sugar in the liquid. Twenty Gm. of the syrup contains approximately 4 Cgm. of iodine.

Iodotannic Syrup. — Vigneron. (*Journ. Pharm. Chim.* [6], **21,** 538.) The following method is claimed to give a pleasant tasting product, and to be easy of preparation: Iodine, 2; tannin, 4; distilled water, 180; sugar, 355; simple syrup, qs., to produce 1,000. Rub down the iodine with a little of the sugar in a small glass mortar. Transfer the powder, with the water and tannin, to a stoppered flask, and warm on the water-bath to 70–80°C. for an hour. The cloudy solution thus obtained is set aside for 36 hours in a warm place, when a clear liquid and a spongy deposit are obtained. The former is tested for free iodine with starch paper, and if a reaction be obtained, heating on the water-bath is again performed until the whole of the iodine has combined. The liquid is then filtered on to the sugar in a tared porcelain dish, and heated on the water-bath. The weight of the product is then made up to 1,000 with simple syrup. The syrup thus obtained is yellowish green by transmitted, slightly red by reflected light. The slight astringent taste may be covered by the substitution of 100 parts of syrup of orange peel for a like weight of the simple syrup. The employment of rhatany, both on account of its taste and utility, is not recommended. The above syrup may be prepared without heat, but it then has an unpleasant taste. (See also *Year-Books*, **1904,** 285; **1902,** 242; **1896,** 189.)

Iodotannic Syrup. H. Wyatt. (*Pharm. Journ.* (4), **19,** 898.) The following formulæ is stated to give a syrup in which the unpleasant flavour is well masked: Iodine, 320 grs.; tannin, 320 grs.; sugar, 12 oz.; tincture of vanilla (1:40), 80 ♏; freshly roasted coffee, 2 oz.; water, to 20 fl. oz.

Make a strong infusion of the coffee by percolation with boiling water until 4 oz. of liquid have passed. Set this aside and continue the percolation until 4 more oz. are obtained. Rub the iodine fine and put it and the tannin in a flask with percolate No. 2 and 1 oz. of the sugar, and heat until the iodine is absorbed. Finally, dissolve the rest of the sugar in this and percolate No. 1, adjust to 1 pint, and add the tincture of vanilla last.

This makes a thin, dark syrup of pleasant odour and taste. The proportion of sugar may be increased if a denser and sweeter syrup be desired.

It is worthy of note that the Continental syrups are almost invariably weaker than those used in English and American pharmacy, which are too frequently over-medicated, with the result that they are unpalatable to the patient and in many cases are badly borne by the stomach, whilst their keeping properties are sadly impaired.

Iodotannic Syrups, Concentrated Iodo-syrup for the Preparation of. L. Martin. (*Journ. Pharm. Chim.* [6], **21,** 295.) A strong iodo-syrup, containing 2 per cent. of iodine, is prepared thus by means of gallic acid: Iodine, 40 Gm.; gallic acid, 40 Gm.; distilled water, 740 Gm.; and sugar, 200 Gm., are placed in a 2 litre flask. This is then fitted to a reflux condenser and heated until the body of the flask is filled with violet vapours. As soon as crystals of iodine begin to be deposited on the inner tube of the condenser, about 20 c.c. of alcohol 95 per cent. is passed down it by means of a small funnel. This washes down the iodine, and its vapour, condensing and falling back, continues to carry back the iodine to the liquid. Heating is continued until all the iodine has combined and no more violet vapours are evident. The flask is then detached, another 1,000 Gm. of sugar and enough water are added to dissolve the sugar with heat, during which the alcohol will be driven off. When cold the volume is adjusted to 2 litres, and the syrup filtered. The product keeps well, and serves for dilution to form syrups or wines of any required iodine standard. Gallic acid is used instead of tannin, as the product is pleasanter in taste, but tannin may be used, in the same quantity, if desired.

Isopral Mixture. (*Merck's Report*, **18,** 104.) Isopral may be thus dispensed as a mixture: Isopral, 3; proof spirit, 10; simple syrup, 70; peppermint oil, sufficient to flavour. Dose, 1 tablespoonful.

Kola Granules. M. Gemayel. (*Journ. Pharm. Chim.*, **21,** 192.) Soft extract of kola, free from glycerine, 75; castor sugar, 1,000; alcohol 60 per cent., q.s. Place the extract in a porcelain capsule, add to it a little of the alcohol, warm, and stir until the mass becomes fluid and homogeneous. Then transfer to a mortar and wash out the capsule with two washings of alcohol, warming gently each time, and add these to the alcoholic solution; add the sugar quickly in small quantities at a time, working well in so as to produce a homogeneous mass. Pass this through a fine wire sieve, and dry in thin layers on paper in the stove at 60°C. Again sift, allow to cool, sift a third time, and preserve in well stoppered bottles. Granules of *coca, cinchona, calumba, condurango* and other extracts soluble in alcohol may be prepared in a similar manner. *Glycerophosphites* and other water-soluble salts may be prepared by using cold water instead of alcohol, mixing the medicating ingredients directly with the sugar in the mortar. By combining the two processes, such preparations as kola-cinchona-glycerophosphates in granular form may be prepared. (See also *Year-Book*, **1904,** 276.)

Lead Subacetate, Strong Solution of. G. F. Merson. (*Pharm. Journ.* [4], **20,** 70.) The author agrees with the statement of others that the solution may be satisfactorily prepared in the cold, but he does not find the long standing mentioned by Squire to be necessary.

A series of experiments made, working on 100 c.c. quantities of finished solution, showed that, by rubbing the salts to fine powder and mixing in a mortar with sufficient distilled water to form a smooth cream (2 or 3 c.c. only is required for 100 c.c. lot of the solution), allowing to stand for a few minutes with occasional stirring, then transferring to a bottle and shaking from time to time, the full B.P. strength of solution was obtained in very much less time than a week.

Made as above, and allowed to stand for 1 hour before filtration, the sp. gr. was 1·2213, and the yield of $PbSO_4$ when estimated gravimetrically 0·253. A similar experiment with fresh materials continued for 3 hours gave sp. gr. 1·2234 and 0·307 $PbSO_4$. Another lot, continued for 6 hours, yielded sp. gr. 1·2345 and $PbSO_4$ 0·318. Still another, after 12 hours, gave sp. gr. 1·2418 and $PbSO_4$ 0·323, whilst a final experiment, extending over 3 days, showed practically the same results as at the end of 12 hours, as did also a lot made by boiling as the B.P. directs.

The above figures were obtained working on an oxide which was afterwards ascertained to fall short of B.P. requirements, but the comparative results illustrate the point. Later experiments conducted with pure materials gave concordant results, and, of course, showed correct gravity and yield of lead sulphate.

It is advisable to allow the mixture to stand in the mortar for some little time before transferring to the bottle, in order that the " cake " which forms at first may be thoroughly broken up and powdered, thus allowing the solvent free access to the mixed solids. If transferred too soon to the bottle this cake forms, and is only with difficulty, if, indeed, at all, thoroughly broken up by subsequent shaking.

Gravimetric assay is preferable to the official volumetric process of estimation.

The following is the process adopted: To 50 c.c. of distilled water add 5 c.c. of dilute sulphuric acid and heat in a small flask to about 90°C., and add 1 c.c. of the lead subacetate solution from a pipette. Counterpoise two small filters and moisten them with warm water. Carefully decant the contents of the flask portion by portion upon the filters, well rinsing the flask with water. Wash the precipitate with warm water till free from acid, dry in a water oven and weigh. It is to be noted that a measured quantity was used simply for convenience in the experimental stages—for comparison with the official requirements, 1 Gm. or other convenient weight must be taken.

A number of commerical samples examined gave varying results, both in sp. gr. and in lead content A number of samples of litharge from various wholesale sources were examined, and it was found that several of these when used in the official proportion failed to produce a solution coming up to the official sp. gr. Moderate traces of red lead existed in these, as also other impurities, indicating that they were not strictly official.

Lenigallol Paste. — Kromayer. (*Merck's Report*, **18,** 120.) Lenigallol, 1; zinc oxide, 1; starch, 1; yellow vaseline, 2.

Licorice Powder, Compound. J. Evans. (*Pharm. Journ.* [4], **20,** 363.) The following table gives the result of the examination of samples of the powder, full details of the methods employed being given in the original paper :—

	Moisture	Total Ash	Insol. Ash	Soluble Ash	Extract by Alcohol 70 per cent	Sugar	Alcohol Extract, less Sugar	Sulphur
1 .	3·86	5·12	2·26	2·86	60·52	50·0	10·52	8·92
2 .	4·20	6·54	3·98	2·56	60·16	47·7	12·46	8·49
3 .	3·98	4·84	2·36	2·48	60·08	49·2	10·88	8·91
4 .	3·68	4·88	2·00	2·88	63·44	50·0	13·44	8·90
5 .	3·84	4·66	1·68	2·98	63·10	49·6	13·50	8·78

Samples 4 and 5 were prepared by the author. The remainder are commercial samples.

Liniment of Potassium Iodide with Soap. J. H. Shuttleworth. (*Pharm. Journ.* [4], **19,** 376.) The limited use of this liniment is attributed to the unsatisfactory consistence of the preparation as made according to the official directions. It is regarded as one of the best liniments from the therapeutic point of view, being rapidly absorbed by the skin. The omission of lemon oil, and substitution of soft for curd soap, as follows, is advocated :—

Sapo. mollis, B.P., i.; pot. iodidi, ℥iss.; glycerini, ℥i.; aq. destillatæ, ℥x.

This yields a faintly opalescent jelly when freshly made, which gradually clears itself on keeping; it is not quite liquid enough to be placed into narrow-mouthed bottles, but is very readily absorbed by the skin. If a more liquid preparation be desired, half the quantity of soft soap might be used.

This yields a more liquid preparation, which can be easily poured from narrow-mouthed bottles. The mode of preparation is simplicity itself. Place the soft soap in the mortar, add the glycerin, triturate well, and when thoroughly mixed gradually add the distilled water, in which the potassium iodide has been previously dissolved, thoroughly mixing after each addition.

Liniment of Potassium Iodide with Soap. P. Boa. (*Pharm. Journ.* [4], **20,** 69.) If fuller details were given with the official directions for the preparation of this liniment, a satisfactory and uniform preparation would result. The directions for preparing it should read :--

Mix the soap, distilled water, and glycerin in a porcelain dish ; weigh the dish and contents, and note the weight ; heat on a water-bath, with occasional stirring, till the soap be dissolved ; make up with hot distilled water to the weight noted ; pour the liquid gradually into a mortar in which is the iodide of potassium reduced to powder, mixing briskly by trituration during the addition of the liquid ; continue trituration until a white and creamy product be obtained ; set aside in the mortar till cold ; then add the oil, and mix thoroughly by trituration.

Linimentum Hydrargyri. H. G. Greenish. (*Pharm. Journ.* [4], **19,** 737.) The formulæ of Finnemore (*Year-Book*, **1904,** 292) are approved, that containing one-sixth the official amount of ammonia being recommended, since, on standing for 3 months, it showed only a very slight separation. The liniment prepared simultaneously by the official process had completely separated in 1 week.

Liquid Extract of Taraxacum. W. H. Lenton. (*Pharm. Journ.* [4], **20,** 650.) The varying characters of the commercial liquid extract is attributed to the indefinite instructions in the official directions. Repercolation with alcohol 30 per cent., to obtain a " valoid " preparation, is found to give a satisfactory product.

Maize Stigmata, Extract and Syrup of. L. Grimbert (*Journ. Pharm. Chim.* [6], **20,** 155.) Infuse 1 kilo. of cut maize stigmata for two hours, in sufficient boiling water to cover them, then press and strain. Repeat the process with a second portion of boiling water. Evaporate the bulked liquids on the water-bath to 400 Gm. Cool and add water, 300 Gm. Allow to stand, filter, and evaporate to a soft extract. One part of this extract gives a bright solution with 10 parts of water. The object of adding water to the partly evaporated syrup is to throw out those bodies which would render the final product turbid on dilution. Thus obtained, the extract is suitable for the preparation of the syrup by mere solution in simple syrup, thus:—

Syrup of Maize Stigmata. The above extract of maize stigmata, 12·5 Gm.; simple syrup, 990 Gm. Dissolve.

Mercuric Nitrate Ointment. C. O. Snavely. (*Amer. Journ. Pharm.*, **77**, 233.) The official process of the U.S.P. is thus modified: Heat lard oil, 760 Gm., to 100°C.; withdraw from the heat and add nitric acid, 100 Gm.; when reaction moderates, again heat until effervescence ceases; at this point the liquid should not be disturbed by stirring. Further increase the heat to boiling point; maintain at that temperature for 10 or 15 minutes, then allow to cool to about 40°C. Meanwhile dissolve red mercuric oxide, 75·5 Gm., in nitric acid, 75 Gm., without heat, and pour the solution into the cooled fatty mixture. Raise the temperature to 60°C., and maintain at that temperature until no further evolution of gas occurs, then remove from the heat. When the mass has become quite cold, mix intimately by the use of a glass rod. The product will be an ointment of true mercuric nitrate, and not a mixture of mercuroso-mercuric nitrates (as in the B.P.); it will also have a less pronounced odour than the official preparation.

Mercuric Oxide, Yellow, Ointment of. F. Schanz. (*Merck's Report*, **18**, 95.) The following formula is recommended for the preparation of an ointment devoid of grittiness, suitable for ophthalmic use: Freshly precipitated yellow mercuric oxide, 1 to 10; anhydrous lanoline, 10; white vaseline to make 100.

Mercury Cyanide as a Disinfectant. A. Richaud. (*Journ. Pharm. Chim.* [6], **20,** 97.) Although cyanide and oxycyanide of mercury may be employed indifferently as sterilizing agents, especially for surgical instruments, as a matter of fact much of the so-called oxycyanide of mercury of commerce is simply true cyanide. True oxycyanide of mercury is not a commercial article; it is about 5 times less soluble than true cyanide, and, moreover, takes much longer to dissolve. The oxycyanide is not a stable body, its solutions decomposing and blackening at 80°C. It is suggested, therefore, that the use of the so-called oxycyanide should be abandoned, and the definite, more soluble, and more stable cyanide substituted for it, the more so since the latter salt is not more toxic. Mercury cyanide has been tried in hospital surgical practice as a disinfectant with perfectly satisfactory results.

Myrrh Tincture, Dispensing, in Aqueous or Saline Solutions. E. A. Ruddiman. (*Proc. Amer. Pharm. Assoc.*, **52**, 223.) Honey, in the proportion of 1 dr. to 7 drs. of the solution, is recommended to prevent the agglutination of the resin when tincture of myrrh is required to be diluted with water or saline solutions. This addition will generally keep the myrrh resin suspended for some time.

New Dressings. — Zelis. (*Pharm. Zeit.*, **49**, 998.) SUBSTITUTES FOR FERRIC CHLORIDE. *Stypticine* is cotarnine hydrochloride; it forms a yellow powder readily soluble in water, may be used as a most efficient hæmostatic in the form of gauze, lint, or wool. *Stypticine gauze* 33 per cent. is prepared with a solution of stypticine, 100 Gm.; glycerin, 25 Gm.; distilled water, 375 Gm., to moisten 303 Gm. of gauze. *Stypticine wool* 20 per cent. is made with stypticine, 200 Gm.; glycerin, 30 Gm.; distilled water, 1,900 Gm. for 1,000 Gm. of absorbent cotton. *Stypticine lint* 25 per cent. may be prepared with stypticine, 75 Gm.; glycerin, 15 Gm.; distilled water, 400 Gm. for 300 Gm. of lint. The dressings are impregnated with the solutions in the usual manner and dried at a low temperature in the dark, for the salt is easily decomposed. The great objection to stypticine is its high price. (See also *Year-Book*, **1899**, 199.)

Styptol. This is neutral phthalate of cotarnine, which occurs in yellow soluble crystals. Dressings made from it should be prepared in the cold. The quantities used are the same as for stypticine. (See also *Year-Book*, **1904**, 247.)

Cotargite is a combination of cotarnine hydrochloride and Fe_2Cl_6 occurring in orange, readily soluble scales. In preparing dressings, half the water in the above formulæ may be replaced by alcohol, in which cotargite is soluble. The dressings may thus be prepared at a lower temperature, for the compound is very unstable.

SUBSTITUTES FOR IODOFORM. *Iodoterpin* is a syrupy brown liquid obtained by the action of iodine on terpin. It is miscible with water, giving red brown solutions. Dressings are prepared with it containing 10 and 20 per cent.; they should be dried at the lowest possible temperature in the dark.

Isoform in its commercial form is a paste consisting of equal parts of glycerin and para-iodo-anisol. It is soluble in warm water, so that dressings of absorbent *gauze*, 2, 5 or 10 per cent., may be prepared by impregnating 1,200 Gm. of the material with a solution of 48, 120, or 240 Gm. of the paste in solution in tepid water and drying at a low temperature. *Cotton*, 5 or 10 per cent., is prepared with powdered isoform, not with the glycerin paste.

Euguform, or acetyl-methylene-di-guaiacol, is obtained by the condensation of acetyl-guaiacol and formaldehyde. It is a pale yellow powder, insoluble in water, so that the *gauze* is prepared with a suspension in alcohol and glycerin. *Five per cent. gauze:* Euguform, 60 Gm.; alcohol, 400 Gm.; glycerin, 60 Gm.; water, 1,200 Gm. for 1,200 Gm. of gauze. *Ten per cent. gauze:* Euguform, 120 Gm.; alcohol, 600 Gm.; glycerin, 90 Gm.; water, 900 Gm. for 1,200 Gm. of gauze. The *wool* is prepared with the powder. (See also *Year-Book*, **1901**, 146; **1904**, 212.)

Vioform, oxyquinoline chloro-iodide, is also insoluble in water; the 5 and 10 per cent. *gauzes* are prepared in a similar manner to those of euguform. (See also *Year-Book*, **1902**, 211.)

Quinine lygosinate being soluble in alcohol, that menstruum is employed for preparing the 5 or 10 per cent. gauze, 120 Gm. being dissolved in 1,400 Gm. of alcohol for the former, and 240 Gm. for the latter, for 2,400 Gm. of gauze. The *wool* is similarly prepared.

Iodeugenol dressings require to be dried at a low temperature, for it is decomposed at 80°C. Five and 10 per cent. *gauze* are made by dissolving 60 or 120 Gm. of iodeugenol in 400 or 800 Gm. of ether, then adding, in a stoppered bottle 1,200 or 1,000 Gm. of alcohol, and 50 or 75 Gm. of glycerin. This quantity of solution is sufficient for 2,400 Gm. of *gauze*. For stronger gauzes, from 20 to 30 per cent., a little colophony is added to the impregnating solution. The wool is prepared with the powder.

Nux Vomica Extract of the New Codex. E. Bourquelot. (*Journ. Pharm. Chim.* [6], **20**, 289.) Coarsely powdered nux vomica, 1,000; alcohol 70 per cent., 6,000; ether, q.s.; sugar of milk, q.s. Moisten the drug with alcohol, 800, and pack in a percolator. Let stand for 24 hours, add more alcohol, again macerate for 24 hours, then percolate with the remaining menstruum. Distil off the alcohol on the water-bath, evaporate the residue in a tared capsule to about 150 Gm. Pour this into a half-litre flask, wash the capsule with 50 c.c. of boiling water, and add this washing to the rest. Cool the bulked liquid and add to it ether, 50 c.c. Shake cautiously, avoiding the formation of an emulsion ; allow to separate, and remove the ethereal layer ; repeat the ether washing twice more. Cautiously evaporate the bulked ethereal liquid and wash the oily residue with 15 c.c. of boiling water, adding acetic acid drop by drop until a distinct excess is present. Then filter the mixture through a moistened filter, wash the filter with a little water, and add the filtrate to the ether-washed aqueous portion. Evaporate the bulked aqueous extract in a tared capsule to about 200 Gm., and when cold weigh again exactly. Weigh off 5 Gm. of the liquid extract, and dry to constant weight at 100, and note the percentage of dry extract obtained. Weigh off 4 Gm. of the liquid extract, and mix in a separator with 20 c.c. of the following menstruum : Alcohol 95 per cent., 2 volumes ; solution of ammonia (sp. gr. 0·960), 1 volume ; distilled water, 1 volume. After thorough mixing, shake for 5 minutes with $CHCl_3$, 20 c.c., allow to separate, and remove the $CHCl_3$ layer. Repeat the shaking out twice more with 15 c.c. of $CHCl_3$ each time, and bulk the chloroformic solutions in a flask ; distil off the whole of the $CHCl_3$, and add to the dry residue 20 c.c. of $N/10H_2SO_4$ with 50 c.c. of distilled water. Leave on the water-bath for 15 minutes, then filter, wash the flask and filter with water, bulk the filtrate and washings, and when cold make up the volume to exactly 200 c.c. Introduce 50 c.c. of this solution (corresponding to 1 Gm. of fluid extract) into a 125 c.c. flask ; add ether, 20 c.c., and iodeosin solution (0·2 per cent.), 5 drops. Then titrate the excess of acid with N/100NaOH solution, with constant agitation, until the aqueous layer acquires a permanent rose tint. Divide the number of c.c. of N/100NaOH solution used up by 10, subtract the number found from 5, multiply the remainder by 0·0364 (the mean molecular equivalent of strychnine and brucine) and the product by 100. The result is the percentage of total alkaloids in the liquid extract. When $p =$ the percentage of dry extract in the liquid, A the percentage of total alkaloids, P the weight of the liquid extract, the quantity of milk sugar, q, to be added to yield a dry extract, containing 16 per cent. of total alkaloids may be found by the equation—

$$q = \frac{A\,P}{16} - \frac{p\,P}{100}$$

This quantity of milk sugar is then added to the liquid extract, and the whole is evaporated to dryness, powdered, and preserved in a well-closed vessel. The powdered extract gives a cloudy solution with water. To determine the total alkaloids in the powdered extract, operate as above on 2 Gm.

Official Galenicals, Commercial Samples of. By H. W. and S. C. Gadd. (*Pharm. Journ.* [4], **20,** 435.) The following figures are the summary of observations of wholesale products extending over 5 years :—

Name.	Specific Gravity at 15 5°C			Extractive, Determined by Drying in a Water-oven for Two Hours.		
	Maximum	Minimum	Average	Maximum.	Minimum	Average
Ext. Cascar. Sagrad. Liq. .	1·064	1·045	1·05	27·5	20·0	22·5
Ext. Ergot. Liq.	1·022	1·000	1·012	14·49	9·08	11·92
Ext. Glycyrrh. Liq. . . .	1·150	1·127	1·141	50·08	39·4	45·81
Ext. Tarax Liq.	1·061	1·015	1·040	28·96	20·65	24·20
Liq. Calumb Conc. . . .	0·995	0·937	0·985	6·3	3·52	4·7
Liq. Chiratæ Conc. . . .	1·000	0·933	0·979	5·49	3·20	4·11
Liq. Cuspar. Conc. . . .	1·011	1·001	1·007	9·9	7·0	8·7
Liq. Quassiæ Conc. . . .	0·991	0·976	0·970	0·79	0·28	0·45
Liq. Rhei Conc.	1·045	0·995	1·025	15·92	9·84	13·14
Liq. Senegæ Conc. . . .	1·020	1·004	1·015	16·09	8·46	12·74
Liq. Sennæ Conc.	1·076	0·994	1·052	22·44	15·44	19·3
Liq. Serpentar. Conc. . . .	1·004	0·997	1·00	5·5	5·3	5·4
Tinct. Aconiti	0·900	0·898	0·899	1·85	1·51	1·7
Tinct. Aloes	0·982	0·979	0·981	9·13	8·06	8·55
Tinct. Arnicæ	0·897	0·893	0·895	0·97	0·52	0·75
Tinct. Aurantii	0·881	0·872	0·878	2·3	1·1	1·87
*Tinct. Benz. Co.	0·903	0·844	0·893	21·28	15·7	18·1
Tinct. Buchu	0·934	0·927	0·930	4·4	3·27	3·87
Tinct. Calumb.	1·08	0·916	0·932	1·15	0·83	1·01
Tinct. Camph. Co.	0·923	0·913	0·916	0·52	0·23	0·33
Tinct. Cannab. Ind.	0·844	0·842	0·842	4·06	3·12	3·56
Tinct. Canthar.	0·836	0·832	0·834	0·27	0·17	0·22
Tinct. Capsici	0·898	0·889	0·892	1·14	0·66	0·81
Tinct. Card. Co.	0·949	0·941	0·944	7·8	6·1	6·9

* Determination of aromatic acids as suggested by Barclay—

	Average of a few samples.
Free acid as benzoic	2·01 per cent.
Combined acid as benzoic	2·85 „ „

Name.	Specific Gravity at 15·5°C.			Extractive, Determined by Drying in a Water-oven for Two Hours.		
	Maximum.	Minimum	Average.	Maximum	Minimum.	Average.
Tinct. Catechu	0·981	0·968	0·972	16·37	13·6	15·58
Tinct. Chiratæ	0·930	0·917	0·921	1·1	0·84	1·00
Tinct. Cimicifugæ	1·02	0·918	0·933	1·29	0·97	1·05
Tinct. Cinchonæ Co.	0·917	0·904	0·910	6·9	3·07	4·51
Tinct. Cinnam.	0·904	0·901	0·902	2·2	1·9	2·05
Tinct. Cocci	0·954	0·952	0·953	2·35	1·8	2·01
Tinct. Colchici Sem.	0·962	0·956	0·956	3·35	2·6	3·14
Tinct. Croci	0·926	0·923	0·924	2·2	1·9	2·0
Tinct. Cubebæ	0·845	0·843	0·844	2·53	1·61	2·08
Tinct. Digitalis	0·932	0·923	0·929	4·36	3·5	3·83
Tinct. Gelsemii	0·925	0·916	0·919	1·75	0·9	1·30
Tinct. Gent. Co.	0·969	0·960	0·964	6·13	3·76	5·33
Tinct. Guaiaci Ammon.	0·910	0·899	0·904	19·5	15·16	17·27
Tinct. Hamamel.	0·960	0·943	0·951	2·12	1·83	2·10
Tinct. Hydrastis	0·925	0·920	0·922	2·66	2·05	2·33
Tinct. Hyoscyam.	0·959	0·951	0·955	3·44	2·27	3·10
Tinct. Jaborandi	0·964	0·956	0·959	4·86	2·36	3·87
Tinct. Jalapæ	0·910	0·905	0·908	—	—	—
Tinct. Kramer.	0·949	0·933	0·940	7·76	4·40	6·22
Tinct. Lavand. Co.	0·840	0·834	0·835	0·60	0·32	0·49
Tinct. Limonis	0·877	0·873	0·875	2·1	1·24	1·61
Tinct. Lobel. Æther	0·829	0·814	0·817	2·10	1·45	1·74
Tinct. Lupuli	0·932	0·927	0·929	4·4	3·42	4·03
Tinct. Myrrhæ	0·857	0·846	0·851	8·0	4·40	5·91
Tinct. Podophylli	0·847	0·840	0·843	3·04	2·9	2·95
Tinct. Pruni Virg.	0·935	0·930	0·933	3·90	3·10	3·36
Tinct. Pyrethi	0·908	0·893	0·896	3·77	0·56	1·8
Tinct. Quassiæ	0·945	0·941	0·943	0·54	0·33	0·39
Tinct. Quillaiæ	0·922	0·917	0·919	1·45	1·16	1·25
Tinct. Rhei Co.	0·975	0·963	0·969	[*]5·76	4·24	5·13
Tinct. Scillæ	0·969	0·957	0·963	13·36	10·89	12·05
Tinct. Senegæ	0·944	0·932	0·938	6·47	5·4	5·04
Tinct. Stramonii	0·962	0·953	0·958	3·9	3·25	3·53
Tinct. Strophanthi	0·895	0·890	0·891	0·7	0·39	0·55
Tinct. Sumbul.	0·901	0·894	0·898	2·75	2·25	2·49
Tinct. Tolutana	0·868	0·864	0·866	9·94	9·06	9·38
Tinct. Valer. Ammon.	0·937	0·932	0·934	4·76	2·98	3·75

Ointment for Psoriasis, Unna-Dreuw's. (*Pharm. Centralh.*, **45,** 737.) Chrysarobin, 20; cade oil, 20; salicylic acid, 10; vaseline, 25; soft soap, 25. Mix.

Ointments in Collapsible Tubes, Method of Filling. J. W. Plenderleith. (*Pharm. Journ.* [4], **20,** 81.) Take a piece of parchment paper just large enough to hold the ointment comfortably, and roll the ointment in it into a cylinder narrower than the internal diameter of the metal tube. Push it into the tube, leaving some of the paper sticking out. Press the tube together, and, holding it down firmly with the edge of a spatula, pull out the parchment paper, which slips out quite clean, leaving the ointment in the tube. If a stiffish paste is to be thus filled into a tube the paper may be smaller, and be allowed to remain in, as it does not readily slip out.

---

[*] These were determined on the unfinished tinctures before the addition of the glycerin.)

Orthoform, Precautions in the Compounding of. — Bardet. (*Journ. Pharm. Chim.* [6], **20,** 48.) Although the application of orthoform as an anæsthetic for mucous inflammatory affections is undoubtedly useful, and gives excellent results, the drug requires to be kept and dispensed with care. If not carefully stored in non-actinic bottles and free from access of air, it is easily decomposed, and then instead of exerting a sedative and anæsthetic action, it becomes a decided irritant, causing vesicles with erythema and pruritus. This is particularly the case when it is mixed with excipients. Orthoform should never, therefore, be prescribed in the form of ointment. Either the powdered drug alone should be used or its alcoholic solution. The latter keeps well, and has never been found to cause ill effects. If it be desired to prescribe a compound application, anæsthesine should be employed instead of orthoform.

Pareira, Liquid Extract of. H. G. Greenish. (*Pharm. Journ.* [4], **19,** 698.) As the result of a prolonged investigation of the pharmacy of the drug the following process is suggested for the preparation of the liquid extract. Pareira root in No. 10 powder, 100 ; alcohol (90 per cent.) ; glycerin ; water ; alcohol (20 per cent.), of each a sufficient quantity.

Mix 20 of alcohol with 20 of glycerin and 60 of water ; moisten the root with 40 of this mixture, pack in a percolator, and percolate with the remainder, continuing the percolation with 20 per cent. alcohol until exhausted. Reserve the first 75, concentrate the subsequent percolates to a soft extract, and dissolve in the reserve, adding sufficient 20 per cent. alcohol to make 100. Stand for 14 days and filter. (Solids by weight, liquids by measure.)

Pepsin, Determination of the Digestive Power of. E. W. Lucas. (*Pharm. Journ.* [4], **19,** 376.) Examination of commercial pepsins shows that none meet the official requirements, which is attributed to the unsatisfactory nature of the pharmacopœial test.

The sources of error in applying the official test are two. In the first place, coagulated white of egg rubbed through a twelve-hole sieve does not appear in the fine shreds intended, but in more or less compacted masses. These masses offer but little surface to the pepsin, and cannot be separated even by the most vigorous shaking. In the second, it is not practicable to weigh so small a quantity as 0·005 Gm. of a hygroscopic substance like pepsin. It is therefore suggested to modify the official monograph somewhat as follows :—

Tested in the manner described one part should dissolve 2,500 times its weight of freshly coagulated white of egg in six hours, the resulting solution being only faintly opalescent.

Into a stoppered bottle or flask of about 250 c.c. capacity introduce 20 c.c. of the pepsin solution (containing 0·005 Gm. pepsin). Place 12·5 Gm. of the freshly coagulated white of egg in a small mortar with 50 c.c. of acidulated water and triturate until reduced to uniform granules. Transfer to the flask, washing out the last traces of solid matter with another 50 c.c. of the acidulated water. Place the flask in a water-bath, so that the water is higher up the flask outside than the mixture inside, and digest at a temperature of 105° F. (40·5°C.) for 6 hours, shaking vigorously at intervals of 15 minutes. The " white of egg " should be prepared as directed at present.

To make the pepsin solution, triturate 0·25 Gm. pepsin and 1 Gm. sodium chloride in a small mortar until evenly mixed ; add acidulated water very carefully at first, mix well, and transfer to 1,000 c.c. flask ; wash the mortar well with more of the acidulated water to make the solution up to 1,000 c.c. Preserve for 24 hours, shaking at intervals and immediately before use. Every 20 c.c. of this solution will contain 0·005 Gm. pepsin.

Pepsin Elixir Compound. W. F. Jackman. (*Proc. Amer. Pharm. Assoc.*, **52**, 248.) Pepsin and pancreatin, of each 15 Gm. ; diastase, 1 Gm. ; lactic acid, 1 c.c. ; hydrochloric acid, 2 c.c. ; glycerin, 250 c.c. ; powdered pumice, 20 Gm. ; compound spirit of orange, 5 c.c. ; compound tincture of cardamom, syrup of raspberries, white wine, of each 100 c.c. ; colour q.s., water to make 1,000 c.c.

Pepsin, Essence of. H. P. Hynson. (*Proc. Amer. Pharm. Assoc.*, **52,** 195.) The following formula for the preparation of a pepsin essence, resembling certain commercial American brands, is suggested by W. S. Scoville. Pepsin, 22·5 Gm.; rennin, 16·4 Gm.; lactic acid, 2 c.c.; tincture of fresh orange peel, 10 c.c.; sugar, 35 Gm.; glycerin, 125 c.c.; white wine, 350 c.c.; water q.s. to make 100 c.c.

Pepsin Mixture. G. Edlefsen. (*Merck's Report*, **18,** 145.) The usual small dose of pepsin is considered to be insufficient, and the following stronger mixture should be prescribed. Pure pepsin, 10; dilute hydrochloric acid, 8; distilled water, 120; syrup of orange peel, 30. One teaspoonful to be taken three times daily in half a wine-glassful of water.

Permanganate Crayons, Disodic Orthophosphate as a Basis for. P. Lemaire. (*Journ. Pharm. Chim.* [6], **20,** 308.) The crystals of non-effloresced official sodium phosphate melted on the water-bath in their own water of crystallization form an excellent basis for permanganate crayons. The finely powdered permanganate is added, in the prescribed proportion, to the fusion liquid, the whole is mixed and run into moulds lubricated with a trace of vaseline oil. As soon as they have set, they should be removed and stored in an airtight vessel; preferably, each crayon is enclosed separately in a small well-corked tube.

Petroleum Cold Cream. F. E. Niece. (*Drugg. Circ.*, **49,** 224.) White wax, ½ lb.; spermaceti, 1 lb.; lanolin (anhydrous), ½ lb.; white petrolatum, 2½ lbs.; distilled water, 1 pint; borax. ½ oz.; tincture of vanilla, 2 drs.; oil of rose, 1 drop; oil of bitter almonds, 3 drops; oil of lemon, 10 drops.

Melt the first four and strain. Heat the water to boiling, dissolve in this the borax and add to the grease. Stir until the mixture sets, then add the tincture and oils.

For witch hazel cream add extract of witch hazel instead of the water. For cucumber cream add cucumber juice.

For arnicated cream add one pint of a mixture consisting of 4 oz. of tincture of arnica flowers to 12 oz. of water.

Petroleum Emulsion. F. E. Niece. (*Drugg. Circular*, **49,** 223.) Liquid amber petrolatum, 4 oz.; powdered gum acacia, 4 oz.; essential oil of almonds, 3 drops; oil of cloves, 3 drops; glycerin, 1 oz.; calcium hypophosphite, 45 grs.; sodium hypophosphite, 85 grs.; potassium hypophosphite, 85 grs.; acid hypophosphorous, 30 ♏; saccharin, 5 grs.; water to make 16 fl. oz. Place the petroleum and oils in a dry mortar, add the powdered gum and rub down smooth, then thoroughly emulsify with 4 fl. oz. of water. Dissolve the salts and acid in 4 fl. oz. of warm water and incorporate the solution with the emulsion; add the glycerin and the saccharin, dissolved in a little water; finally gradually incorporate enough water to make 16 fl. oz.

Petroleum Emulsion, N.F. (*Proc. Amer. Pharm. Assoc.*, **52,** 200.) The following formula is suggested: Petrolatum, 50 Gm.; expressed oil of almonds, 250 Gm.; powdered acacia, 50 Gm.; powdered tragacanth, 25 Gm.; syrup, 100 c.c.; tincture of fresh lemon peel, 15 c.c.; water sufficient to make to 1,000 c.c. Make an emulsion.

Petroleum Emulsions. (*Amer. Drugg.*, **45,** 7.) *Simple Petroleum Emulsion* (S. A. MacDonnell's formula):—Liquid petrolatum, 16 fl. oz.; powdered acacia, 8 oz.; glycerin, 4 fl. oz.; calcium hypophosphite, 288 grs.; sodium hypophosphite, 288 grs.; water, sufficient to make 48 fl. oz.

Triturate the oil with the acacia in a large mortar, and add 16 fl. oz. of water all at once, triturating rapidly to emulsify. Dissolve the hypophosphites in 8 oz. of water and add this. Then add the glycerin and sufficient water to make to 48 fl. oz.

E. F. Cook's formula:—Liquid petrolatum, ℥iv.; acacia, powdered, ℥ij.; oil of wintergreen, ♏xxxij.; water, sufficient to make 16 fl. oz.

Mix the liquid petrolatum with the powdered acacia in a dry mortar, add 4 fl. oz. of water all at once, and triturate the mixture until a perfect emulsion is formed; then add the oil of wintergreen and finally enough water to make the finished product measure 1 pint.

Emulsion of Petroleum with Hypophosphites.—Liquid petrolatum, ℥iv.; acacia, powdered, ℥ij.; calcium hypophosphite, 330 grs.; potassium hypophosphite, 110 grs.; sodium hypophosphite, 110 grs.; oil of wintergreen, ♏xxxij.; water, sufficient to make 16 fl. oz.

Mix the liquid petrolatum with the powdered acacia in a dry mortar, add 4 fl. oz. of water all at once, and triturate the mixture until a perfect emulsion is formed; then add the oil of wintergreen. Dissolve the hypophosphites in 6 fl. oz. of water and add this solution to the emulsion, finally adding enough water to make the finished product measure 16 fl. oz.

Petroleum Products, Petroleum Ether, Vaseline Oil and Vaseline. P. Adam. (*Bull. Soc. Chim.*, **23,** 274.) *Petroleum ethers.* Until the introduction of the automobile, there was no great industrial demand for light, low-boiling petroleum spirit, but since about 1897 the demand for these products has enormously increased. Previous to this, had the fractionation and "cracking" of the oils been carried to the extent that now prevails, the output of petroleum ether would have greatly exceeded the demand. The oils produced by destructive distillation (or cracking) invariably contain considerable proportions of ethylenic carbides, and until purified have an extremely disagreeable odour. These ethylene compounds are removed by agitation with sulphuric acid. *Gazoline* is the lightest fraction of petroleum which has not been subjected to destructive distillation, but merely to fractionation, and subsequent purification with H_2SO_4 and NaOH. The winter-produced article has the sp. gr. 0·640, and distils between 30–85°C. That made in the summer does not begin to boil below 40°C., and has the sp. gr. 0·650. Bromine has no immediate action on it in the cold; it is not affected by mercury acid sulphate, and H_2SO_4 only slightly colours it. *Vaseline oil* is chiefly derived from Caucasian petroleums. It has the sp. gr. 0·875, and distils entirely without alteration between 335–340°C. It contains no nitrogen; H_2SO_4 does not lessen its volume, but gradually colours it; bromine has no action in the cold. *Vaseline* is derived from American petroleum residues. It should have been treated neither with acid nor alkali. That most suitable for pharmaceutical purposes should melt between 35° and 39°C. On distilling, pure vaseline is split up into a distinctly crystalline body and an oil, whereas paraffin is unaltered by distillation. Vaseline should be neutral to litmus; when heated in an open dish it should be entirely volatilized without giving off acrid fumes. It should yield no saponifiable matter when treated with alkali. When heated with H_2SO_4, sp. gr. 1·5, it should give no colour. Fifteen Gm. mixed with 10 c.c. of HNO_3, sp. gr. 1·45, should not show a greater elevation of temperature than 2°C. Mixtures of paraffin and vaseline oil show a greater rise of temperature. The determination of the viscosity also serves to distinguish pure vaseline from mixtures of paraffins. This may be performed in the following manner, without the use of a viscosimeter, by means of a drop-counter (or short graduated pipette). A large test-tube of sufficient size to hold the drop-counter and a thermometer is filled with pure vaseline and kept at 60°C. in the water-bath, which is also furnished with a thermometer. A spiral of copper wire made to support the drop-counter, so that the point does not touch the bottom, is then introduced. When the temperature registered by the two thermometers has been maintained steadily at 60° for at least 20 minutes, the drop-counter is introduced into the melted vaseline, and the time taken for the liquid to reach a given mark is noted. The experiment is then repeated with the vaseline to be tested.

Phosphated Iodotannic Syrup and Wine. L. Grimbert. (*Journ. Pharm. Chim.* [6], **20**, 155.) *Phosphated Iodotannic syrup.* Iodotannic syrup [p. 263 *ante*], 980 Gm.; mono-calcic phosphate, 20 Gm. Dissolve. Twenty Gm. of this syrup contains 0·04 Gm. of iodine and 0·40 Gm. of monocalcic phosphate.

Phosphated Iodotannic Wine. Iodine, 2 Gm.; tannin, 4 Gm.; syrup of rhatany, 100 Gm.; mono-calcic phosphate, 20 Gm.; Malaga wine, 860 Gm. Dissolve the tannin and the iodine in water, 60 Gm., on the water-bath; cool and filter. Mix the filtrate with the syrup of rhatany in a tared dish and evaporate to 120 Gm. Pour this into the wine, mix and dissolve the mono-calcic phosphate. Let the mixture stand for 24 hours, then filter. Fifteen Gm. of this wine contains 0·03 Gm. of iodine and 0·30 Gm. of monocalcic phosphate.

Pill Excipient for Dried Ferrous Sulphate. W. Duncan. (*Pharm. Journ.* [4], **20**, 167.) The use of any excipient containing moisture may cause pills of dried ferrous sulphate to crack on keeping, due to expansion. Woolfat used as the excipient prevents this.

Pill Excipient for Ferrous Chloride and Potassium Permanganate. J. W. Plenderleith. (*Pharm. Journ.* [4], **20**, 81.) Woolfat, 9; yellow beeswax, 1, melted together, forms an excipient which allows ferrous chloride or potassium permanganate to be massed and rolled into pills without the addition of any inert powder. The pills thus made will keep for 3 months. The proportion of the excipient to be used is one-fourth of the weight of the salt to be massed.

Pilula Ferri. H. G. Greenish. (*Pharm. Journ.* [4], **19,** 737.) The adoption of the modification of the formula suggested by Lucas and Stevens (*Year-Book,* **1904,** 297) is recommended as giving pill mass less prone to oxidation than the official preparation.

Plasters, Bacteria in. — Marpmann. (*Zeitsch. für. angew. Mikros und Klin. Chem.*, through *Journ. Pharm. Chim.* [6], **20,** 311.) The author finds that the surfaces of plasters are infected by all kinds of bacteria. Plasters with a gelatin basis, such as court plaster, are specially liable to be loaded with microbes, since the plaster basis is a perfect culture medium; and the method of exposing the spread plaster in sheets to dry in the gently heated stove is an effective method of collecting air-borne germs and incubating them. Even if these plasters were germ-free when manufactured, they soon become contaminated when carried in the pocket or purse according to the prevailing custom. Even with specially-prepared specimens, macerations of 1 square cm. in sterilized distilled water gave, when cultivated, numerous colonies of bacteria which liquefied gelatin. The number of germs in this area of plaster was found to vary from 36 to 726. Another source of infection is the saliva with which it is customary to moisten the surface of these plasters, by licking them before applying them to the abraded surface. The author advocates the use of collodions instead of these possibly septic applications.

Podophyllin and Belladonna Pills (Codex). L. Grimbert. (*Journ. Pharm. Chim.*, **20,** 160.) Podophyllin, 30 Cgm.; extract of belladonna, 10 Cgm.; hard soap, 30 Cgm. Mass and divide into 10 pills.

Potassium Permanganate Pills. A. Jorissen. (*Répertoire* [3], **16,** 511.) Pills massed with the following excipient are found to keep well for 3 months:—Potassium permanganate, 2 Gm.; anhydrous woolfat, 2 Gm.; washed kaolin, 6 Gm. Mass and divide into 100 pills.

Quinine Pills. J. Blomberg, jun. (*Apoth. Zeit.*, **1904, 19,** 907.) Quinine sulphate may be readily massed as follows :—Quinine sulphate, 10 ; compound gum powder, 1 ; sugar, 2 ; simple syrup, q.s. to mass. [The compound gum powder of the Ph.G. IV. consists of powdered gum acacia, 3 ; powdered licorice root, 2 ; powdered sugar, 1.]

Quinine Wine, Thalleioquin Reaction of, prevented by Presence of Bitter Orange. P. Guigues. (*Journ. Pharm. Chim.* [6], **20,** 55.) Commenting on the criticism of E. Léger (*Year-Book*, **1904,** 150), on the thalleioquin test for quinine, the author states that on applying the reaction to the ether residue of a quinine wine which also contained bitter orange, no thalleioquin colour was produced. But if the interfering substances were first removed by washing the acid solution with ether, rejecting this ether extract, then rendering the aqueous solution alkaline and again shaking out again with ether, the thus purified base gave the characteristic colour. In testing quinine wines, therefore, it is necessary first to remove, by shaking out the acid solution with ether, any substances which may mask the reaction.

Ricin Soap. F. T. Gordon. (*Merck's Report*, **14,** 74.) Ricin soap is made by dissolving caustic soda, 75 Gm. in water, 100 c.c., boiling, and adding to this castor oil, 100 Gm. Boil until saponification is complete, then pour into moulds, and allow the soap to set. This soap is an excellent one for toilet use ; is used as an emulsifier ; for making solutions of carbolic acid in water varying in strength between 1 and 50 per cent.; for making glycerin suppositories, and for many other purposes.

As an emulsifier its taste is not objectionable, and, though the emulsion may separate in some cases, it is easily re-emulsified upon shaking. To make glycerin suppositories, dissolve 10 parts of the dry soap in 90 parts of glycerin, and pour into moulds. For surgeons' use, dissolve 1 part of the dry soap in 4 parts of phenol. By dissolving proper quantities of this "Carbolic Mixture" in water, solutions of any desired strength may be obtained. A 2 per cent. ricin soap solution of phenol has been found to be an excellent wash for wounds, which have become soiled with grease and dirt, and for sterilizing surgical instruments.

Saline Solution of Gelatin. L. Grimbert. (*Journ. Pharm. Chim.* **20,** 158.) The following formula has been adopted by the Codex Sub-committee for the preparation of sterilized gelatin solution for hypodermic injection :—White gelatin, 10 ; sodium chloride, 7 ; distilled water, q.s. Dissolve the gelatin and salt in a flat-bottom 1,500 c.c. flask, on the water-bath. Test the solution with litmus paper, and if acid, neutralize with N/10 NaOH solution and make up to 1,000 c.c. with distilled water. Place the flask in an autoclave and heat to 110°C. for 10 minutes, filter the hot liquid and fill doses of 150 c.c. into suitable flasks, previously sterilized. Then heat these in the autoclave for 15 minutes at 110°C.

Salol-coated Pills of Ipecacuanha for Dysentery. W. Roberts. (*La Semaine médicale*, through *L'Union Pharm.*, **44,** 410.) The emetic effects of ipecacuanha may be entirely obviated by administering it in the form of pills coated with salol. This renders them impervious to the gastric secretion, so that they do not disintegrate until the intestine is reached. The dry pills are either dipped in melted salol or coated with an ethereal solution thereof.

Sapophthalum ; Neutral Coconut Soap. P. van der Wielen. (*Apoth. Zeit.*, **19,** 1014.) Superfatted soaps prepared in the usual manner cause much pain when introduced into the eyes, and the higher the molecular weight of the fatty acids combined the more alkaline is the liquid resulting from the dissociation of the soap. A fat was therefore sought with a high saponification equivalent, and therefore with fatty acids of low molecular weight. Such is coconut fat, which has the saponification value 250 to 268·4. The following formula is found to give a perfectly neutral soap : Sixty Gm. of coconut fat is mixed with 36·7 Gm. of NaOH solution, sp. gr. 1·539 ; after standing in contact for 24 hours, the mixture is warmed on the water-bath to complete saponification ; glycerin, 70 Gm., is then added to the mass, and the heating continued until a homogeneous mass results ; coconut oil fatty acids, 60 Gm., are then added, and heat again applied until 0·5 Gm. of the soap dissolved in 20 c.c. of water, in which it will give a turbid solution, no longer shows an alkaline reaction with phenolphthalein. This soap solution sets to a jelly when cold ; its 1 : 12 solution forms a thick liquid, which is easily pourable when slightly warmed. It is turbid at ordinary temperatures, but becomes clear on warming; it is perfectly neutral, and remains so in a 1 : 50 solution; beyond that it gives an alkaline reaction with phenolphthalein. Like all superfatted soaps, it does not lather well. If a 1 : 50 solution be introduced into the eye, it causes a slight pricking sensation, which is removed by washing out. It is useful in dermatological practice, since it may be readily incorporated with active drugs by warming, but it is of special service for ophthalmic work, hence its name, sapophthalum, an abbreviation of *sapo ophthalmicus neutralis.* In collyria it may be prescribed as follows: Sapophthalum, 12·5; dissolve in rose water, 300; distilled water, 87·5; diluted alcohol, 100.

Sterilized Catgut. L. Grimbert. (*Journ. Pharm. Chim.* **20,** 159.) The following directions for sterilizing surgical catgut have been adopted by the Codex Sub-committee. Remove all fat from the catguts by extraction with ether in an extractor. Dry the fat-free gut at 85°C., and allow to cool under a bell jar over H_2SO_4. Introduce them into strong glass flasks containing absolute alcohol and seal with the blowpipe; place these in an autoclave and heat them to 120°C. for 45 minutes; then cool. Before use the gut should be plunged in sterilized distilled water for 15 minutes to render it supple.

Suppositories for Internal Hæmorrhoids. (*Apoth. Zeit.*, **19,** 679.) Powdered extract of hamamelis, 1 gr.; orthoform, 5 grs.; cocaine hydrochloride, ½ gr.; extract of belladonna, ⅙ gr.; extract of opium, ⅛ gr.; cacao butter, 60 grs. Make one suppository; to be used night and morning.

Suppositories, Spermaceti in Place of Beeswax for Hardening. W. S. Scoville. (*Proc. Amer. Pharm. Assoc.*, **52,** 219). After numerous experiments the conclusions arrived at are that spermaceti is to be preferred to beeswax for raising the m.p. of suppositories. Spermaceti may be used in equal weights with chloral, phenols, or essential oils, and the suppositories may be depended upon to melt at the body temperature. With chloral or phenol one-quarter to one-half the weight is sufficient; with volatile oils an equal weight may be safely used. White beeswax raises the m.p. of softer fats much more than an equal weight of spermaceti. If used at all it should be employed with caution and in small quantities, never exceeding 10 per cent. It sets more slowly than spermaceti. Suppositories containing as much as 25 per cent. of chloral may be made with pure cacao butter alone by either the hot or cold process, but in the former case the moulds must be chilled with a freezing mixture of ice and salt before filling.

Suppositories of Witch-hazel and Extract of Hydrastis. (*Proc. Amer. Pharm. Assoc.*, **52,** 253.) The following base will give a suppository of witch-hazel and hydrastis, without separation: Castor oil, 10; beeswax, 15; cacao butter, 90. This base readily melts at the body temperature.

Syrup of Calcium Lactophosphate, Improved. F. Hemm. (*Amer. Drugg.*, **46,** 142.) Precipitated calcium carbonate, 2·5 Gm.; lactic acid, 6·0 c.c.; phosphoric acid, 3·6 c.c.; orange flower water, 2·5 c.c.; simple syrup, q.s.; distilled water, 20·0 c.c.

Mix the acids with the distilled water and orange flower water in a mortar; add the calcium carbonate and triturate until completely dissolved and effervescence ceases; filter or strain through cotton and add about 67 c.c. of syrup or sufficient to make 100 c.c.

Syrups, Official, Suggested Improvements in the Preparation of Certain. H. G. Greenish. (*Pharm. Journ.* [4], **19,** 701, 734.) After full pharmaceutical investigation, the following processes are recommended to be substituted for those at present official.

Syrupus Tolutanus. The process of Farr and Wright (*Year-Book,* **1899,** 366) is adopted.

Syrupus Rhei.—Rhubarb root (cut small), 2 oz.; oil of coriander, 5 ℳ︁; alcohol, 60 ℳ︁; water, 15 fl. oz.; sugar, 24 oz.

Macerate the rhubarb with the water for 12 hours, strain and press; filter the liquid, raise the filtrate to the b.p. for a minute and cool; for every 12 fl. oz. of filtered liquid add 24 oz. of sugar, and dissolve with the aid of a gentle heat. Finally add the oil of coriander dissolved in the alcohol.

This preparation does not represent the full activity of the root. An elixir, in which a mixture of alcohol, glycerin, and water would be the menstruum, might doubtless be devised, and upon this experiments are at present in progress.

Syrupus Pruni Virginianæ. The processes suggested by Lucas (*Year-Book,* **1899,** 212) and by Flett (*Year-Book,* **1902**) have been tried, but are not considered to offer any material advantages over the method at present official.

Tannin Ovules, Suppositories, or Pessaries. L. Grimbert. (*Journ. Pharm. Chim.*, **20,** 158.) Washed and dried gelatin, 10 ; tannin, 3 ; distilled water, 15 ; glycerin, 60 parts by weight. Dissolve the tannin in the cold ; add the gelatin and leave it in contact until all the liquor has been absorbed ; gently warm the glycerin and add the softened gelatin to it ; when dissolved strain through a cloth and run into suitable moulds of about I'5 Gm. capacity. Each suppository contains approximately 50 Cgm. This is the formula suggested for the new Codex.

Tinctures, Displacement by Water in the Preparation of. H. C. T. Gardner. (*Pharm. Journ.* [4], **20,** 548.) The mode of preparation advocated is as follows : The powdered drugs are moistened and set aside in the manner officially directed, to be later transferred to a percolator, packed therein, and percolation allowed to proceed. After an amount of menstruum had been added, which, together with that portion used for moistening the powders, equalled the required volume of tincture, and after it had ceased to pass, a small piece of ordinary white paper was placed upon the top of the marc, and a volume of water carefully poured thereon equal to twice the deficient quantity of percolate.

It was foreseen that some loss in alcohol would take place, yet it appeared that the volume of retained alcohol (or menstruum) might not be so great as to prevent the finished tincture from comparing favourably in alcoholic strength with the same tincture officially prepared. From the results obtained with the limited number of tinctures experimented on, the method gives quite as satisfactory results, under certain conditions, as the pharmacopœial mode. The process of displacement was stopped when the required quantity of percolate was obtained—that is to say, when the tincture was made up to the required bulk. Of the tinctures so prepared the strengths of the menstrua were variously 45, 60, and 70 per cent. alcohol ; the weights of the marcs ranged from 2 oz. to over 3 lb. The weight of marc is important, as it is very doubtful whether a very small marc can give a satisfactory result.

The following table gives the results obtained, which may be compared with those for the same tinctures given by Lucas and Dick (*infra*) and by Brunker (*Year-Book*, **1904,** 568) :—

—	Tincture	Strength of Menstruum (Abs Alcohol by Vol) Per Cent	Quantity of Tincture Made	Total Weight of Powders forming Marc	Duration of Percolation in Days	Specific Gravity of Tincture at 15.5°C	Percentage of Extractive Gms in 100 c c	Alcoholic Strength of Tincture (Abs Alcohol by Vol), Per Cent	Percentage Loss in Alcoholic Strength.
a .	Digitalis . . .	60	4 pints	10 ozs	3 days	0.928	4.00	58.85	1.15
b .	Digitalis . .	60	4 pints	10 ozs	2 days	0.931	3.63	57.40	2.60
c .	Digitalis . . .	60	2½ pints	6¼ ozs	2 days	0.933	4.00	57.90	2.10
d .	Digitalis . .	60	2 pints	5 ozs	3 days	0.936	3.27	55.55	4.45
	Hydrastis . .	60	4 pints	8 ozs	3 days	0.919	2.48	56.05	3.95
	Hyoscyamus . .	45	4 pints	8 ozs	3 days	0.954	2.20	43.00	2.00
	Jaborandi . .	45	15 fl ozs	3 ozs	1 day	0.970	4.94	39.20	5.80
	Strophanthus .	70	4 pints	2 ozs	2 days	0.898	0.57	69.95	0.05
(’) .	Cardamoms, Compound	60	16 pints	3 lbs, 1 oz, 400 grs.	3 days	0.942	4.09	59.30	0.70

Tinctures, Official. E. W. Lucas and A. D. Dick. (*Pharm. Journ.* [4], **20,** 362.) The table on page 289 gives the result of six years' observations of the laboratory manufacture of tinctures.

Unguentum Acidi Carbolici. H. G. Greenish. (*Pharm. Journ.* [4], **19,** 737.) The following formula, due to Taylor, gives an ointment distinctly superior to that produced by the official formula: Phenol, 1; hard paraffin, 6; soft paraffin, 18. Melt the paraffins and dissolve the phenol in the liquid.

Vasenol. A. Kopp. (*Apoth. Zeit.*, **19,** 786.) Vasenol is obtained by adding to vaseline or liquid vaseline certain fatty alcohols of high molecular weight, such as those of lanolin or of spermaceti. These enable the paraffins to be mixed and to form permanent emulsions with considerable quantities of aqueous solutions, and the absorption of the vaseline by the skin is also stated to be increased. *Ordinary vasenol* is an emulsion of yellow vaseline with 25 per cent. of water; it has an unctuous consistence and a yellow colour. It may be mixed with several times its weight of water, and forms an excellent ointment basis for general use. *Liquid vasenol* is a similar preparation obtained with white vaseline oil, and contains 33 per cent. of water. It may be used either in liniments or as a vehicle for dressings and applications, since it may be combined with aqueous liquids in considerable quantities. *Vasenol powder* contains 10 per cent. of vasenol with an absolvent powder. It is useful in certain skin affections.

Vasenol. — Aufrecht. (*Journ. Pharm. Chim.* [6], **21,** 275.) This new ointment basis, according to the patents, is a mixture of mineral fats with fatty alcohols of high molecular weight. A mixture of yellow vaseline, 4; lanoline, 1; water, 1, gives a product closely resembling it.

Vitose. — Aufrecht. (*Pharm. Zeit.*, **50,** 227.) Vitose is a new neutral odourless ointment basis, readily miscible with glycerin, oils, fats, and water. It melts at about 28°C., and has the following percentage composition: water, 2·77; albumin, 1·86; fat, 71·53; glycerin, 23·82; ash, 0·02 per cent.

Xeroform Dusting Powder. E. Toff. (*Apoth. Zeit.*, **20,** 23.) Xeroform, 1; French chalk, 9, mixed, forms an excellent dusting

—	Spec. Grav. at 15·5°C.			Extractive (Gm. per 100 C.c.)			% Alcohol (by Vol.)		
	Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.
Tr. Aconiti . .	0·903	0·895	0·900	1·70	1·20	1·50	68·0	65·8	66·0
Tr. Aloes . .	0·980	0·972	0·976	7·6	6·6	7·4	41·8	38·0	39·0
Tr. Arnicæ . .	0·900	0·894	0·896	0·79	0·65	0·71	69·5	66·0	67·6
Tr. Asafetidæ .	0·919	0·914	0·916	10·0	9·0	9·7	63·0	60·0	62·0
Tr. Aurantii .	0·885	0·879	0·882	1·86	1·57	1·69	75·8	72·0	73·6
Tr. Benzoin. Co.	0·901	0·890	0·895	17·0	15·0	16·1	75·9	71·6	74·4
Tr. Buchu . .	0·935	0·928	0·932	3·8	2·8	3·7	58·0	55·0	56·0
Tr. Calumbæ .	0·926	0·918	0·920	1·1	0·80	0·86	58·0	55·5	57·0
Tr. Camph. Co.	0·923	0·916	0·920	0·35	0·30	0·31	59·0	56·5	57·0
Tr. Cannab. Ind.	0·850	0·846	0·847	4·1	3·4	3·7	87·0	84·8	86·0
Tr. Cantharidis	0·839	0·835	0·836	0·18	0·14	0·17	89·6	88·5	89·1
Tr. Capsici . .	0·898	0·892	0·895	1·2	0·96	0·98	69·0	67·0	68·0
Tr. Cardam. Co.	0·955	0·949	0·952	7·1	6·1	6·6	54·1	52·2	53·3
Tr. Cascarillæ .	0·903	0·898	0·900	2·5	1·99	2·3	67·0	64·5	66·0
Tr. Catechu .	0·985	0·980	0·982	15·6	13·8	14·5	52·7	50·0	51·4
Tr. Chiratæ .	0·925	0·921	0·923	1·13	1·05	1·10	57·9	56·9	57·2
Tr. Cimicifugæ .	0·925	0·922	0·923	1·44	1·25	1·33	58·0	56·5	57·1
Tr. Cinchonæ .	0·925	0·917	0·920	5·8	4·8	5·4	67·0	62·4	64·6
Tr. Cinchon. Co.	0·918	0·914	0·916	4·8	4·1	4·5	65·5	62·8	64·7
Tr. Cinnamomi	0·904	0·900	0·901	2·1	1·45	1·8	66·5	65·5	66·0
Tr. Cocci . .	0·960	0·949	0·950	2·49	2·0	2·3	43·0	42·0	42·5
Tr. Colchici Sem.	0·956	0·950	0·951	2·10	1·90	2·0	43·6	42·0	43·0
Tr. Conii . .	0·902	0·895	0·899	1·40	1·27	1·30	68·0	66·0	66·5
Tr. Croci . .	0·928	0·924	0·926	3·0	2·25	2·5	58·4	56·0	57·5
Tr. Cubebæ. .	0·845	0·840	0·842	1·43	1·25	1·35	86·2	82·0	84·0
Tr. Digitalis .	0·935	0·932	0·933	3·60	2·86	3·36	56·5	54·6	55·8
Tr. Ergot. Am.	0·942	0·936	0·938	3·90	2·72	3·29	51·2	50·1	50·8
Tr. Gelsemii .	0·927	0·920	0·924	1·30	1·20	1·26	57·0	56·5	56·8
Tr. Gentian Co.	0·967	0·961	0·965	4·9	3·5	4·2	43·0	41·8	42·3
Tr. Guaiaci Am.	0·907	0·899	0·902	17·2	14·0	15·5	71·5	69·2	70·0
Tr. Hamamelidis	0·955	0·949	0·953	1·95	1·41	1·68	44·7	43·6	44·0
Tr. Hydrastis .	0·930	0·929	0·929	2·55	1·97	2·30	56·0	55·6	55·8
Tr. Hyoscyami	0·959	0·950	0·954	3·1	2·7	2·9	43·0	41·5	42·0
Tr. Iodi . .	0·881	0·878	0·880	—	—	2·52%I.	86·5	84·0	85·0
Tr. Jaborandi .	0·959	0·957	0·958	2·90	2·45	2·68	43·0	42·0	42·4
Tr. Jalapæ . .	0·914	0·910	0·912	4·6	3·5	3·7	67·0	64·1	66·0
Tr. Kino . .	0·998	0·990	0·997	23·6	20·0	22·0	52·7	48·0	50·0
Tr. Krameriæ .	0·941	0·938	0·940	4·9	4·6	4·8	56·0	53·6	55·0
Tr. Lavand. Co.	0·840	0·839	0·840	0·52	0·46	0·50	88·6	88·0	88·3
Tr. Limonis .	0·880	0·879	0·879	1·44	1·40	1·41	76·5	75·8	76·1
Tr. Lobel Æth.	0·816	0·812	0·814	1·48	0·80	1·40	—	—	—
Tr. Lupuli . .	0·944	0·938	0·940	4·0	3·6	3·8	54·1	49·8	54·0
Tr. Myrrhæ .	0·857	0·849	0·853	4·8	3·9	4·4	84·8	83·4	84·1
Tr. Opii . .	0·959	0·955	0·957	3·6	2·8	3·3	44·7	43·6	44·1
Tr. Podophylli	0·848	0·844	0·847	3·6	2·96	3·4	87·5	85·5	86·5
Tr. Pruni Virg.	0·932	0·931	0·931	2·7	2·3	2·4	54·1	53·7	54·0
Tr. Pyrethri .	0·903	0·901	0·902	1·85	1·50	1·66	69·1	67·5	68·1
Tr. Quassiæ .	0·948	0·944	0·946	0·47	0·16	0·38	44·7	42·0	43·5
Tr. Quillaiæ .	0·927	0·921	0·922	1·38	0·93	1·20	57·9	55·5	57·0
Tr. Rhei Co. .	0·975	0·971	0·973	12·7	12·0	12·5	50·1	48·6	49·4
Tr. Scillæ . .	0·971	0·965	0·968	12·3	10·4	11·0	52·1	51·2	51·8
Tr. Senegæ . .	0·945	0·938	0·941	5·0	4·3	4·6	55·1	54·6	54·7
Tr. Sennæ Co. .	0·991	0·985	0·987	9·0	8·1	8·3	40·0	38·5	39·2
Tr. Serpentariæ	0·901	0·896	0·898	2·0	1·28	1·5	68·0	66·1	67·0
Tr. Stramonii .	0·962	0·952	0·958	3·6	3·2	3·4	43·9	42·1	43·0
Tr. Strophanthi	0·897	0·894	0·895	0·68	0·42	0·51	69·0	68·3	68·6
Tr. Sumbul .	0·906	0·901	0·903	2·70	2·19	2·41	67·0	64·5	66·1
Tr. Tolutana .	0·868	0·864	0·866	8·3	6·8	7·9	83·7	81·0	82·0
Tr. Valer. Am. .	0·944	0·939	0·941	3·68	2·51	2·98	50·7	49·1	50·2
Tr. Zingiberis .	0·844	0·839	0·840	0·37	0·30	0·35	88·5	87·0	88·0

[Compare *Year-Books*, **1901**, 211 ; **1908**, 250 and *ante* 273, 274.]

powder for infants. It is also useful in many applications for adults, for excoriations, perspiring feet and other similar affections.

Zinc Chloride and Iodide Solutions. E. A. Ruddiman. (*Proc. Amer. Pharm. Assoc.*, **52**, 221.) In dissolving a mixture of $ZnCl_2$ and ZnI_2 in water a precipitate frequently occurs, due to the alkalinity of the salt. Commercial $ZnCl_2$ and ZnI_2 are frequently insoluble in water or give solutions which are distinctly alkaline. These should be carefully neutralized with HCl or HI before dispensing.

Zinc Chloride Pencils. (*Pharm. Centralh.*, **1904**, **45**, 867.) Zinc chloride may be rolled into pencils by means of rye flour. Just sufficient water is added to the salt to liquefy it, sufficient rye flour being added to make a workable paste, which is then rolled out into suitable sticks, and dusted over with lycopodium.

NOTES AND FORMULÆ.

PART IV.

NOTES AND FORMULÆ.

Acacia farnesiana in Cuba. (*Schimmel's Report, May,* **1905,** 21, after *Journal d'Agriculture tropicale.*) *Acacia farnesiana,* known in Cuba as "Aroma francesa," has spread to such an extent in the island as to become a troublesome weed. It is suggested that, besides using the blooms for the extraction of the volatile oil, the wood, which is suitable for wheelwrights' work and for furniture making, might be utilized.

Acetic Acid for Skin Application. —Leredde. (*Nouveaux Remédes,* **21,** 213.) Acetic acid is often prescribed in Germany for local application in the form of an ointment, as *Acetic ointment*: Acetic acid, 5; lanoline, 10; vaseline, 60. *Acetic paste* is also used, and thus prescribed: Acetic acid, 2 to 10; vaseline, 8; lanoline, 12; starch, 10.

Almond Meal. (*Nat. Drugg.,* **34,** 454.) Blanched sweet almonds, 20; blanched bitter almonds, 20; rice flour, 2; powdered borax, 1; powdered orris root, 1; perfume, q.s. Reduce the almonds to a paste with the borax, then work in the flour and the orris. Finally add the perfume.

Aniline Colours, Toxicity of. C. W. Chlopin. (*Zeits. für Untersuch. der Nahr. u. Genussmitt.,* through *Pharm. Centralh.,* **45,** 935.) An extended examination of coal tar colours has shown the following to be poisonous when taken internally: Aurantia, mandarin orange II., metanil orange (methyl orange), butter yellow, auramine O, brilliant green, sodium aurine, pure blue for cotton, ursol D, thiocatechin, 1, 2, 3, and T, autogenic black, and Vidal's black. The following are classed as doubtful, having more or less effect on the digestive or excretory organs: Metanil yellow, aniline orange T, pyrotin RR, ponceau RR, benzo-purpurin, erica B, lemon yellow (?), iodo-green, acid green, Bavarian blue DBF and DSF, cerise DN, iodeosin, rhodamine B and G, chrysaniline benzoflavin II., methylene green, primulin and quinoline yellow. Toxicity on the human skin was determined by applying wool dyed with the colours to the hands and feet for 10 to 18 days; only two of the above, auramine O and ursol D, were found to have a harmful effect. The most toxic colours are found among the yellows, succeeded by the blues, the browns, and the blacks; very slight toxicity is found among the green or violet colours, and not a single poisonous red was met with, and only one of doubtful toxicity.

Animal Charcoal an Antidote to Naphthols. J. Lesage. (*Journn. Pharm. Chim.* [6], **20,** 143.) Animal charcoal administered in large doses is a certain antidote to the toxic action of naphthols; it minimizes the effects, and enables an animal which has been treated with a lethal dose to recover. Wood charcoal has similar properties, but is much less active than animal charcoal in neutralizing the toxic effects of naphthols.

Antipest, a Domestic Insecticide. F. E. Niece. (*Drugg. Circ.*, **49,** 223.) Kerosene oil, 12 pints, 16 fl. oz.; mercury oleate, 2 oz.; nitrobenzol, 2 oz.; alkanet root, crushed, 1 oz. Mix the oleate and the nitrobenzol, add the kerosene, and macerate the alkanet in the mixture for 2 days, then decant. To be applied by painting or spraying to the localities infested with insects. To be kept from proximity to fire.

Antiseptic Vapour. (*Nouveaux Remèdes*, **21.**) Phenol, 5; thymol, 2; eucalyptol, 1; alcohol 90 per cent., 10. Mix a tablespoonful in a large open dish full of water, and boil over a spirit stove.

Ants at the Syrup Jars, To Get Rid of. — Tazwell. (*Nat. Drugg.*, **35,** 42.) The following may be useful to pharmacists abroad:—

Take 2 or 3 (or more) turns of twine around the bottle, and tie there; then, turning the bottle sideways, saturate the twine with oil of cloves. The bottle will be ant-proof for at least a month, and can be kept so perpetually by renewing the oil of cloves from time to time, or whenever necessary Another plan, or rather a modification of the same plan, is to cut out, for each syrup jar, a disc of cardboard a trifle larger in diameter than the jar, saturate the edge of the disc with oil of clove, and stand the jars on the same. Of course, the oil will have to be renewed from time to time.

Application for Perspiring Hands. (*Nouveaux Remédes Formulary*, **21.**) Eau de Cologne, 6; tincture of belladonna, 1. Mix. Rub the hands twice or thrice daily with half a teaspoonful of the mixture.

Application for Warts. — Mantelin. (*Journ. des Practs.*, through *Répertoire* [3], **16,** 406.) The following mixture is to be applied daily: Chloral hydrate, 1; acetic acid, glacial, 1; salicylic acid, 4; ether, 4; collodion, 15. Warts treated with this disappeared in a month without leaving a trace. Simultaneously 10 grs. of magnesia were given internally daily.

Artificial Musk Solution. H. Mann. (*Seifensieder Zeit.*, **32,** 234.) For toilet soap cinnamein may be used as a solvent for artifical musk; for perfumery, benzyl benzoate is the best solvent; 200 Gm. of synthetic musk is dissolved in 1 kilo. of this ester, warmed to about 40°C., and remains in solution on cooling. It is not thrown out when the solution is mixed with essences and floral extracts in compounding bouquets.

Asthma Cures. (*Pharm. Zeit.*, **49,** 978.) *Asthma Papers.*—(1) Impregnate bibulous paper with the following, then dry: Extract of stramonium, 10; potassium nitrate, 17; sugar, 20; warm water, 200. Dry. (2) Blotting or grey filter paper, 120; potassium nitrate, 60; powdered belladonna leaves, 5; powdered stramonium leaves, 5; powdered digitalis leaves, 5; powdered lobelia, 5; myrrh, 10; olibanum, 10; phellandrium fruits, 5. Make a strong infusion of the drugs, moisten the paper therewith and dry. *Stramonium Candle.*—Powdered stramonium leaves, 120; potassium nitrate, 72; Peruvian balsam 3; powdered sugar, 1; powdered tragacanth, 4. Water, q.s. to mass; roll into suitable shapes and dry. *Asthma Fumigating Powders.*—(1) Powdered stramonium leaves, 4; powdered aniseed, 2; potassium nitrate, 2. (2) Powdered stramonium, 30; potassium nitrate, 5; powdered tea, 15; powdered eucalyptus leaves, 15; powdered Indian hemp, 15;

powdered lobelia, 15; powdered aniseed, 2; distilled water, 45. *Cleary's Asthma Fumigating Powder.*—Powdered stramonium, 15; powdered belladonna leaves, 15; powdered opium, 2; potassium nitrate, 5. *Schiffmann's Asthma Powder.*—Potassium nitrate, 25; stramonium, 70; belladonna leaves, 5. *Neumeyer's Asthma Powder.*—Potassium nitrate, 6; sugar, 4; stramonium, 6; powdered lobelia, 1. *Fischer's Asthma Powder.*—Stramonium, 5; potassium nitrate, 1; powdered *Achillea millefolium* leaves, 1. *Vorlaender's Asthma Powder.*—Stramonium, 150; lobelia, 80; arnica flowers, 80; potassium nitrate, 30; potassium iodide, 3; naphthol, 1,100.

[All the herbal ingredients in coarse powder; moisten with the water in which the potassium nitrate has been previously dissolved, and dry.]

Balm of Columbia. (*Drugg. Circ.*, **49**, 241.) Borax, 1 oz.; glycerin, 1½ oz.; oil of rosemary, 15 ♏; alcohol, 2 oz.; water, 14 oz. Dissolve the borax in the water, and the oil in the alcohol, and mix.

Benzoin Lotion. (*Nouveaux Remédes*, **21**, 47.) Simple tincture of benzoin, 30; tincture of quillaia, 30; glycerin, 30; terpinol, 2; oil of rose geranium, 2; salicylic acid, 2; water, 250. One, 2 or 3 tablespoonfuls added to 3½ pints of water forms an efficient and pleasant antiseptic lotion or douche.

Calcium Nitrate as a Manure. E. S. Bellenoux. (*Comptes rend.*, **140**, 1190.) Calcium nitrate is stated to give better results as a manure than sodium nitrate. Potatoes and sugar beets treated with the lime salt gave more starch and sugar repectively than control crops treated with sodium nitrate. The nitrate is prepared by treating calcium chloride with sodium nitrate; on concentrating, the sodium chloride, being less soluble, separates first and is removed.

Camphor Application for Itching in Skin Diseases. (*Nouveaux Remédes*, **21**, 215.) (1) Lanolin, 90; camphorated oil, 10; chloral hydrate, 1. (2) Zinc oxide, prepared chalk, camphorated oil, lime water, a.a., equal parts to make a paste.

Carbolic Salve, Improved. S. Bayne. (*Amer. Drugg.*, **45**, 4.) Carbolic acid, ʒiiss.; camphor, ʒiv.; Lanolin, ℥i.; oil of sassafras, ♏xv.; white wax, ʒvi.; white petrolatum (refined),

℥viij. Melt the carbolic acid and camphor, and while warm add the oil of sassafras. Melt the wax, petrolatum and lanolin together, add the solution of camphor, and stir occasionally while cooling. The caustic properties of the acid are neutralized by the camphor.

Chap-salve. (*Chem. and Drugg.*, **65,** 1050.) Lanolin, 2; white petrolatum, 6; glycerin, 8; camphor flowers, 1. Melt the first two and add the camphor; when dissolved, place in a mortar, and while stirring add the glycerin.

Chemical Plant Foods. (*Drugg. Circ.*, **49,** 116.) I.—Sodium phosphate, 4 oz.; sodium nitrate, 4 oz.; ammonium sulphate, 2 oz.; sugar, 1 oz. Use 2 teaspoonfuls to a gallon of water.

II. Ammonium phosphate, 30 Gm.; sodium nitrate, 25 Gm.; potassium nitrate, 25 Gm.; ammonium sulphate, 20 Gm.; water, 100 litres. One application of this a week is enough for the slower growing plants, and two for the more rapid growing herbaceous ones.

III. Calcium phosphate, 4 oz.; potassium nitrate, 1 oz.; potassium phosphate, 1 oz.; magnesium sulphate, 1 oz.; iron (ferric) phosphate, 100 grs.

Choline the Toxin of Epilepsy. (*Merck's Report*, **18,** 45.) Formanek has found that choline has a marked toxic effect when injected into animals, and J. Donath attributes the convulsions of epilepsy to the presence of the base in the cerebrospinal fluid. He has demonstrated that it occurs in that fluid from epileptics, and Wilson finds it in the cerebrospinal fluid in cases of nervous degeneration such as paraplegia and cerebral tumour, but it is not present in hysteria or in secondary syphilis. Choline as well as neurine are far more poisonous than is supposed, and exercise a violent irritant effect on the cerebral cortex.

Cider Must, Preparation of, from Sterilized Apples. G. Perrier. (*Comptes rend.*, **140,** 324.) The author communicates some results which will have considerable interest to cider makers. It is found that if apples be first washed in water, and then soaked for 10 minutes in a 8 per mille solution of formaldehyde, and again washed with water and drained, they are rendered practically sterile, so that when crushed the pulp will keep indefinitely, and will not ferment until sown with fresh must.

When fermentation then takes place as usual, the cider formed is of excellent quality. This method of procedure prevents the introduction of undesirable "wild" ferments which are always found on the skins of apples, and thereby greatly improves the quality of the cider produced. It also enables the cider maker to ferment at any desired period, and to supply new cider at any season of the year. The cider mills and vessels employed should be washed with a 4 per mille solution of formaldehyde before the process of crushing. Apple must thus prepared has withstood a journey from France to Buenos Ayres and back without showing any signs of fermentation.

Crême de Cacao for the Hair. (*Nat. Drugg.*, **34,** 454.) Cacao butter, melted, 5; castor oil, 30; bergamot oil, 1; eau de Cologne, 20. Mix.

Diazo-reaction of Ehrlich to Diagnose Typhoid. G. Giese. (*Pharm. Prax.*, through *Répertoire* [3], **17,** 7.) The author thus applies Ehrlich's diazo-test to urine. (A) Ehrlich's reagent. Sulphanilic acid, 0·5 Gm.; HCl 25 per cent., 5 Gm.; water, q.s., to make 100 c.c. (B) Nitrous solution. Sodium nitrite, 0·5 Gm.; water, 100 c.c. At the time of testing, 50 c.c. of A is mixed with 5 c.c. of B. Ten c.c. of urine is added to 10 c.c. of the mixture, followed by 2 c.c. of AmOH solution 10 per cent. Normal urines give a dark yellow colour, which soon passes to red. The deposit of phosphates thrown down is rose coloured. In the case of typhoid or of pulmonary tuberculosis, the urine is coloured carmine red, passing to scarlet, and the deposit is violet or green.

Dips for Sheep-scab. (*Pharm. Journ.* [4], **20,** 140.) The Board of Agriculture and Fisheries has recently issued an order, called "The Sheep-Scab Order of 1905," in exercise of the powers vested in the Board by the Diseases of Animals Acts, 1894 to 1903. The order requires the use of sheep-dips approved by the Board, and contains three prescriptions for dips, which have received such approval after experimental trials. These three prescriptions are as follow (quantities for 100 gallons of bath):—

(1) *Lime and Sulphur.* Mix 25 lb. of flowers of sulphur with 12½ lb. of good quick-lime. Triturate the mixture with water until a smooth cream without lumps is obtained. Transfer this

to a boiler capable of boiling 20 gallons, bring the volume of the cream to 20 gallons by the addition of water, boil and stir during half an hour. The liquid should now be of a dark red colour; if yellowish, continue the boiling until the dark red colour is obtained, keeping the volume at 20 gallons. After the liquid has cooled, decant it from any small quantity of insoluble residue, and make up the volume to 100 gallons with water.

(2) *Carbolic Acid and Soft Soap.* Dissolve 5 lb. of good soft soap, with gentle warming, in 3 quarts of liquid carbolic acid (containing not less than 97 per cent. of real tar acid). Mix the liquid with enough water to make 100 gallons.

(3) *Tobacco and Sulphur.* Steep 35 lb. of finely ground tobacco (offal tobacco) in 21 gallons of water for 4 days. Strain off the liquid and remove the last portions of the extract by pressing the residual tobacco. Mix the whole extract, and to it add 10 lb. of flowers of sulphur. Stir the mixture well to secure an even admixture, and make up the total bulk to 100 gallons with water.

NOTE.—The period of immersion in these dips should not be less than half a minute.

Eau de Beauté Cosmetic. (*Les Corps gras Industrielle*, through *Nat. Drugg.*, **34**, 257.) The following is an excellent formula for a "skin beautifier": Lanolin, 100; glycerin, 100; rose water, 150; simple tincture of benzoin, 30; mucilage of gum arabic, 30; terpineol, 4; hyacynthine, 1; oil of bergamot, 2 parts. Melt the lanolin and add the glycerin and rosewater under constant agitation. Next stir in, vigorously, the tincture of benzoin and mucilage, and finally incorporate the perfumes.

Emollient Skin Balm. (*Drugg. Circ.*, **49**, 237.) Quince seed, ½ oz.; water, 7 oz.; glycerin, 1½ oz.; alcohol 90 per cent., 4½ oz.; salicylic acid, 6 grs.; carbolic acid, 10 grs.; oil of bay, 10 drops; oil of cloves, 5 drops; oil of orange peel, 10 drops; oil of wintergreen, 8 drops; oil of rose, 2 drops. Digest the quince seed in the water for 24 hours, and then press through a cloth; dissolve the salicylic acid in the alcohol; add the carbolic acid to the glycerin; put all together, shake well, and bottle.

Fat, Formation of, from Albumin by Bacilli. S. P. Beebe and B. H. Buxton. (*Amer. Journ. Physiol.*, through *Chem. Centralblat.*, **76**, 461.) The aggregated needle-shaped crystals formed by cultures of *Bacillus pyocyaneus* in bouillon are found to consist of higher fatty acids.

Foot-Powder. (*Medical Record*, through *Chem. and Drugg.*, **65,** 1050.) Potassium permanganate, 13; alum, 1; French chalk, 50; zinc oxide, 18; calcium hydrate, 18 parts. This powder is used in cases of sweating feet. Each night a warm foot-bath of a 1 per cent. solution of potassium permanganate is used.

Formalin and Geranium Oil for Dental Caries. (*Merck's Report*, **18,** 74.) Formalin, 2; alcohol 90 per cent., 2; geranium oil, 1. Mix.

Formalin Dentifrice Elixir. — Mathis. (*Nouveaux Remèdes*, **21,** 44.) Formaldehyde solution, 2; tincture of cinchona, 60; glycerin, 60; oil of peppermint, 2; oil of star anise, 1·50; oil of cloves, 1; oil of cinnamon, 1; alcohol, 100 parts by weight. The tincture of cinchona is a tonic and astringent, the effects of which on the gums is very prompt. The glycerin modifies the effect of the formaldehyde, which at times is a little too strong, and serves as a vehicle. The essential oils are purely flavouring.

Formation and Distribution of Essential Oil in an Annual Plant. E. Charabot and G. Laloue. (*Bull. Soc. Chim.* [3], **33,** 236, and *Comptes rend.*, **140,** 667.) Continuing the investigation of the formation and distribution of essential oil in plants (see also *Year-Book*, **1901,** 66; **1902,** 76; **1904,** 340), attention has been directed to the cycle of phenomena which occurs with an annual plant. *Ocymum basilicum* was selected for the purpose, since its oil, consisting mainly of methylchavicol and terpenes, renders it suitable for the purpose. Before the inflorescences appear essential oil is formed in the green organs of the plant, this formation being most active in the youngest parts. The proportion of oil in the leaves gradually increases until inflorescence commences. This oil is relatively poor in methylchavicol and rich in more soluble terpene compounds. As soon as blooming commences, the amount of oil in the leaves diminishes and that in the flowering tops increases, and at the same time the proportion of methylchavicol increases. When flowering is over and the seeds are ripe, the amount of oil again becomes greater and more soluble in the leaves, while the solubility of the oil of the inflorescence remains the same. At this period a biochemical action seems to affect the methylchavicol, converting it into more soluble terpene compounds, which are then transferred back to the leaves.

Fruit Vinegars. (*Nat. Drugg.*, **35**, 174, after *Neueste Erfindungen und Erfahrungen.*)

Strawberry Vinegar. Ripe strawberries, stemmed, 1 ; pure vinegar, 15 parts. Mash the berries up to a pulp and pour over them the vinegar. Pour the mixture into bottles, which should be fitted with good tight corks. Put in a warm place for from 6 to 8 days, shaking them from time to time. At the end of this time filter off and preserve the filtrate in small bottles filled to the very top, and keep in a cool place.

Lemon Vinegar. Peel 12 lemons, press out the juice, and set in a cool place to clarify. Pound up the peelings and pour over the mass 15 litres of best vinegar. Now add the lemon juice and filter the whole. Preserve the filtrate in well-filled and corked bottles, in a cool place.

Orange Vinegar. Peel 2 oranges, squeeze out the juice, and put in a bottle to clear. Rub up the peelings and pour over the mass 15 litres of good vinegar, add the clarified juice, and filter. Preserve in well-filled and well-corked bottles.

Raspberry Vinegar. Prepare in the same way as for strawberry vinegar.

Herb Vinegar. Marjoram, fresh, 25 ; thyme, fresh, 25 ; anchovies, cut fine, 7 ; curled mint, fresh, 7 ; sweet basil, fresh, 5 ; shallots, 3 ; good vinegar, 1,500 parts. Cut the herbs, etc., up fine, mix in a jar of sufficient capacity, and pour the vinegar over them. Let macerate 8 or 10 days, then filter off.

Glycerin-Camphor Ice. F. E. Niece. (*Drugg. Circ.*, **49**, 224.) Powdered camphor, 2 drs. ; liquid paraffin, 2 drs. ; solid paraffin, 5 drs. ; white petrolatum, 8 drs. ; glycerin, 2 drs. ; alkanet root, 1 dr. Digest the camphor and alkanet with the paraffin (solid and liquid) and petrolatum on a sand bath, add the glycerin, strain, stir till cool, then cut into blocks.

Gonococci, Stain for. A. von Wahl (*Pharm. Centralh.*, **45**, 677, after *Centralb. für Bacteriol.*) employs the following stain for the detection of gonococci : Saturated alcoholic solution of auramine, 4; alcohol 95 per cent., 3; saturated alcoholic solution of thionin, 4; saturated aqueous solution of methyl green, 6; distilled water, 12. Gonococci are coloured dark red violet to almost black, whereas other cocci and bacteria take the stain but slightly or not at all. Staining does not take longer than 10 seconds, and the whole process of examination not more than 5 or 10 minutes.

Hydrogen Peroxide as a Dentifrice. — Mathis.* (*Nouv. Remédes*, **21**, 46.) Hydrogen peroxide is the best of all dentifrices, since when used in solution to rinse the mouth it oxidizes all organic matter inaccessible to the brush in the interdental spaces and in carious cavities. Its unpleasant taste requires that it should be used with an aromatic water. It strengthens the gums, whitens the teeth, and prevents buccal infection. It should, however, be used with caution by men who have moustaches, on account of bleaching effects. It may be used by women as a weak depilatory to prevent the growth of hair on the face.

Hydrogen Peroxide as an Etching Fluid for Copper. (*Nat. Drugg.*, **35**, 111.) A new etching fluid for copper plate is H_2O_2, to which a little dilute ammonia water is added. It is said to bite in very rapidly and with great regularity and uniformity.

Ink for Typewriter Ribbon. (*Apoth. Zeit.*, **19**, 932). Transparent soap, 1; glycerin, 4; water, 12; alcohol (methylated) 94 per cent., 24; spirit-soluble aniline colour, q.s. Dissolve the soap in the mixed glycerin and water, dissolve the aniline colour (nigrosin for black) in the spirit. Mix.

Ink Formulæ. (*Amer. Drugg.*, **45**, 303.) *Indestructible Ink.* Graphite, in impalpable powder, 400; gum copal, 720; iron sulphate, 35; tinct. galls, 35; indigo sulphate, 140 parts. Mix the materials and boil them in sufficient water to make a fluid of the desired consistency. After boiling for a few minutes let it stand a while for the grosser particles to settle. Then decant and bottle.

Black. Ink for Brass Stamps. Ordinary printers' ink thinned with olive oil; or—Aniline black, E., 3 drs.; distilled water, 10 drs.; wood vinegar, 10 drs.; alcohol, 10 drs.; Glycerin, 7 oz. Mix and dissolve.

Ink for labelling Porcelain Jars. Rosin, 20; borax, 35; alcohol, 150; water, 250 parts; nigrosin, a sufficient quantity. Dissolve the rosin in the alcohol and the aniline colour in the solution. Dissolve the borax in the water.

Ink for Zinc Labels. Potassium chloride, 60; copper sulphate, 120; aniline blue, 1; dilute acetic acid, 100; distilled water, 1,800 parts. Dissolve the potassium chloride and the copper sulphate in 1,400 parts of water. Mix the acid with the rest of the water and dissolve the blue in the mixture. Mix the solutions.

Green Copying Ink. In 1,000 parts of aqueous extract of gall apples dissolve: Iron sulphate, 30·0; copper sulphate, 0·5; sulphuric acid, 2·0; sugar, 8·0; wood vinegar, rect., 50·0; indigo carmine, 30·0 parts.

Ink Powder. The following is said to afford a powder which needs but maceration with 100 parts of water for a few days to make an excellent ink:—Gall nuts, powdered, 16; acacia, powdered, 8; cloves, powdered, 1; iron sulphate, powdered, 10 parts. Put in an earthenware or glass vessel, cover with 100 parts of distilled water, set aside and let stand for two weeks, giving an occasional shake daily. Decant and bottle.

Copper Laundry Ink. (*a*) Copper chloride, cryst., 85; sodium chlorate, 106; ammonium chloride, 53; water, distilled, 600; (*b*) glycerin, 100; mucilage gum arabic (gum, 1 part; water, 2 parts), 200; aniline hydrochlorate, 200: distilled water, 300 parts. Make solutions (*a*) and (*b*) and preserve in separate bottles. When wanted for use, mix one part of solution (*a*) with four parts of solution (*b*).

Iso-safrol, Toxicity of. (*Muench Med. Woch.*, through *Schimmel's Report, May*, **1905,** 89.) An eczematicous urticaria was observed to occur on the body of a workman whose face, neck and arms had been splashed with iso-safrol, the eruption occurring on those parts which had not been touched by the liquid, and which were of long duration. Waldvogel has found that when iso-safrol is administered to rabbits by inhalation or subcutaneous injection it has an intense action on the nervous system and the vessels of the vital organs. It produces dilatation of the veins in man when merely applied to the skin.

Keratin of the Eggs of the Ringed Snake. J. Galimard. (*Journ. Pharm. Chim.*, **21,** 499.) The eggs of the ringed snake, *Tropidonotus natrix*, yield 12·71 of crude keratin, which differs from similar bodies in containing but little sulphur and tyrosine but much leucine. This keratin is not digested by pepsin, and is insoluble in all solvents. When hydrolized with 3 per cent. H_2SO_4 it gives small quantities of arginine, lysine, histidine, tyrosine, and 19·4 per cent. of leucine.

Keroclean, a Non-inflammable Cleanser. F. E. Niece. (*Drugg. Circular*, **49**, 223.) Kerosene, 1 oz.; commercial carbon tetrachloride, 3 oz.; oil of citronella, 2 drs. Mix and filter if necessary.

Laundry Specialities. (*Mineral Water Review*, through *Chem. and Drugg.*, **66**, 154.) *Liquid Laundry-blue.* Oxalic acid, 8 oz.; Chinese blue, 16 oz.; hot water, 6 gals. Strain.

Paste Laundry-blue. Good ultramarine blue, 18 lb.; carbonate of soda, crystals, 15 lb.; liquid glucose, 3½ lb.; soluble blue, ½ lb.; water, a sufficiency. Make into a mass, cut into cakes or squares, and dry at 70°F. Then wrap each cake of blue in a piece of flannel and tie at the neck.

Liquid Cold-water Starch. Sago flour, 10 lb.; salt, 4 lb.; white dextrin, 2 lb.; glycerin, 2 lb.; water, 13 pints. Put up in pint or quart bottles.

Cold-water Starch and Gloss. Sago flour, 22 lb.; rice starch, 9 lb.; salt, dry, 6 lb.; powdered borax, 6 lb.; white dextrine, 6 lb. The directions should read as follows:—Make sufficient of the starch powder into a stiff paste with cold water, then dilute to usual consistency with boiling water. Do not boil the mixture.

Wax Polish. Stearin, 1 lb.; white wax, 2 lb.; spermaceti, 4 lb. Melt together and cast into cakes. The linen is made hot by ironing the wax cake lightly rubbed over the hot linen, and a polishing-iron used to spread the wax over the surface.

Starch-glaze Powder. Powdered borax, 42 lb.; potato starch, 16 lb.; common salt, 14 lb.; white dextrin, 3 lb. One oz. of this powder is mixed with 2 pints of starch.

Linoleum and Floor Wax. (*Apoth. Zeit.*, **19**, 679.) (1) Yellow wax, 3; carnauba wax, 6; oil of turpentine, 10; petroleum benzene, 8. (2) Ceresin, 60; hard paraffin, 40; oil of turpentine, 200; wax orange, 2. (3) Carnauba wax, 2; ceresin, 1; raw palm oil, 1; oil of turpentine, 6; petroleum benzine, 4;

(4) Beeswax, 30; spermaceti, 10; water, 160; pearl ashes, 5; oil of turpentine, 40; wax orange, 2.

Lipol Lip Salve. F. E. Niece. (*Drugg. Circ.*, **49,** 224.) Camphor, ½ oz.; menthol, ½ oz.; eucalyptol, 1 dr.; petrolatum (white), 1 lb.; paraffin, ½ lb.; alkanet root, ½ oz.; oil of bitter almonds, 15 drops; oil of cloves, 10 drops; oil of cassia, 5 drops. Digest the root in the melted paraffin and petrolatum, strain, add the other ingredients, and pour into jars while hot. To be applied night and morning, rubbing in well with the finger tips.

Lithographic Transfer Ink. (*Drugg. Circ.*, **49,** 87.) White wax, 8; white soap, 2; shellac, 2; lampblack, enough. Melt together the wax and soap, and, before they become hot enough to take fire, stir in by degrees enough lampblack to make the mixture black; then allow the whole to burn for 30 seconds. When the flame is extinguished, add the shellac in small portions at a time, with constant stirring. Put the vessel on the fire again until the mass is kindled, put out the flame, allow it to cool a little, and run it into moulds.

Ink thus made will make as fine or coarse lines as are desired, and its traces will remain unchanged for years before being transferred.

Malt Extract Soap. —Sarason. (*Rev. de Therap.*, through *Nouveaux Remèdes*, **21,** 229.) By adding 10 per cent. of malt extract to perfectly neutral soap a product is obtained which gives an excellent lather, and which does not irritate the most sensitive skins. The free acid of the malt extract neutralizes the alkali formed by the dissociation of the alkali fatty salts by water. This soap keeps well, and does not undergo the decomposition to which superfatted soaps are liable.

Medicinal Plants, Cultivation of. E. M. Holmes. (*Pharm. Journ.* [4], **20,** 585, 690, 788.) Directions are first given for the cultural treatment of the plants of which practical recognition is required in the " Minor " syllabus.

Aconitum napellus can be moved at any time between October, when the leaves disappear, and April. March is the best month, as the young leaves, which are then just starting, are very characteristic in their appearance, and this plant can then be easily distinguished by the green tint of the young leaves from the brownish leaves of *A. paniculatum*, and the more broadly lobed leaves of *A. variegatum*, two species which are often met with in gardens. Aconite is not very particular as to soil, but succeeds best where it is slightly damp or retentive; and, therefore, on a light soil does best on the shady side of the garden. The roots spread some distance, and starve less vigorous growers near it, so that 1 foot should be allowed on each side between it and other plants. The date of flowering of *A. napellus* is at the end of May. The plant takes two or three years to flower, if raised from seed, but the lower part of the stem, if earthed up, forms a root from each of the lowest leaf-buds. Buds are also produced on the roots, so that the plant is best propagated by these methods. The flowering tops are sometimes eaten by the caterpillars of a rare moth, *Plusia moneta*, which appear in April. The larvæ may be detected by the leaves being bent over towards the centre, and by the black spots where the flower buds are eaten.

Papaver rhœas. There are several other species confounded with the *Papaver rhœas*, inasmuch as they have red flowers and somewhat similar leaves. The true *Papaver rhœas* has a globose fruit, and the hairs on the peduncle are spreading, but there is a variety, *strigosum*, which has adpressed hairs on the peduncles. The allied species with red flowers are: *Papaver hybridum*, L., which has a furrowed globose capsule with rigid hairs on it, and leaves with narrow segments; *P. argemone*, which has club-shaped capsules, furnished with rigid hairs; *P. dubium*, which has an oblong capsule without hairs, but with adpressed hairs on the peduncles, and of this species there are two varieties, viz.: (*a*) *P. lamottei*, with short leaf lobes, and a capsule broadest at top; and (*b*) *P. lecoqui*, with long leaf lobes, and the capsule broadest at about one-third from the apex. There is also occasionally found wild a plant having a purple patch at the base of each petal, the petals also being of a deeper red colour; this is probably a hybrid with the garden species *P. umbrosum*, from which pollen has probably been carried by insects. The flowers of all these are probably collected for manufacturing Syrupus Rhœados.

Papaver rhœas does best in the sun, in a comparatively dry and light soil. The seeds should be sown where it is intended to grow, for the plant, like other poppies, does not readily recover after transplantation. The stem being weak and straggling, it is best to sow the seed sparingly in patches. To obtain fine flowers a little manure water is very useful, for although the red poppy likes a light soil, moisture and manure vastly improve its vigour.

Papaver somniferum. This species grows wild in chalky cornfields in this country. The form so found, var. *hispidum*, has a lilac or pale mauve corolla, with a purplish spot at the base of the petals, and the peduncle has rigid spreading bristly hairs. But occasionally a glabrous form is met with, var. *glabrum.* The garden varieties, which are more or less hybridised and double-flowered, have usually greyish seeds (mawseed), whereas the white flowered variety (*album*) has pure white flowers and white seeds. This is best raised from poppy seeds found in the poppy capsules of commerce. Occasionally, however, these white seeds produce coloured poppy flowers. In such case there is usually a reddish layer to be seen when the outer white coat of the seed is scraped. The white poppy, in order to grow freely, requires rich soil and plenty of moisture in dry weather. The poppy-heads, when fully formed, if collected for trade purposes, are generally bent in the middle of the peduncle, and allowed to hang downwards to dry. To produce them of large size it is necessary to remove the succeeding flowers, or to feed the plant well.

Brassica alba and *B. nigra* grow readily from seed. The former prefers a calcareous soil; the latter a damp, rather rich soil.

Cochlearia armoracia also prefers a soil not too dry, but does not readily flower if grown in the shade; it does best in a clayey soil. It does not fruit in this country.

Althœa officinalis grows naturally on the edge or sides of marsh ditches, where its roots are always in damp soil, and does well in any damp soil. But it is liable to be attacked by the caterpillar of a moth, *Xanthorhoe cervinata*, which eats holes in the leaves, resting when not feeding in a short spiral position; it falls off directly the plant is touched, coiling itself on the ground into a ring like the unripe fruit of the mallow.

Ruta graveolens flourishes best where its roots are protected by rockery or in stiff calcareous clay, and where not exposed to the east or northerly winds. If grown in shade it is apt to grow too luxuriantly and succulent, and consequently suffers more in winter than if grown in the sun.

Cytisus scoparius grows best in poor sandy soil. In rich soil it grows very large, and a series of young plants should be kept so as to cut down the old plant when it becomes large and unsightly.

Rosa canina is, of course, rarely grown, but like all roses prefers a rich loamy soil, and if much space cannot be spared for it, should be grown near a fence and pruned, so as to make only lateral growths, the weaker shoots being cut out and the old ones cut down in the autumn when large strong shoots have arisen from the base during the summer. These may be pruned in March, all the shoots that have produced leaves at the end of that month being cut away so far as the leaf-buds have opened.

Prunus lauro-cerasus. Of this plant there are a number of varieties, var. *caucasica* being one of the hardiest, and var. *colchica* one of the least hardy ; var. *schipkaensis* is a dwarf slow-growing variety, but does not show the glands at the back of the leaves so well as the larger varieties, but in another small-leaved but taller plant, var. *camelliæfolia*, the glands are easily seen. In var. *rotundifolia* the leaves are rounded at the apex, and var. *latifolia* has the largest leaves. Like many rosaceous shrubs and trees some of the branches are apt to die off. This can be prevented to a great extent by keeping the plant clipped in spring before the new leaves appear, and in autumn at the end of September before the frost begins. The shrub flowers more readily if growing where its roots are restricted, and in a sunny aspect, and if the branches are thinned out so as to admit light and air between them. The fruit, like black cherries (whence its name of cherry-laurel), is rarely produced.

Bryonia dioica. This plant grows only too rapidly in a sandy soil. It is easily raised from seed, and should be planted near a fence, as it grows with great rapidity and starves the roots of herbaceous plants near it, and climbs for a great distance. The plant being diœcious, a male and female plant are required to illustrate its character. The species used by homœopaths, viz. *Bryonia alba*, is monœcious and has black berries, but it does not grow so readily as the *B. dioica* in this country.

Conium maculatum is not particular as to soil. It is biennial, and does not, therefore, flower in the first year. In rich soil in the shade it will grow 6 or 8 feet high in the second year, when it flowers.

Fœniculum capillaceum can be grown from the fruits of commerce ; but, as it takes two years at least before it flowers, it is a saving of time to procure an established plant from a florist. It grows well in a rich soil, but does not flourish in the shade. A sunny bank with a somewhat stiff soil answers best. The seaside form has more succulent and rigid leaflets, and is an interesting plant to grow for comparison, as is also the Japanese plant with small fruit.

Œnanthe crocata grows naturally on the banks of streams or ditches, and consequently will not flourish under ordinary garden conditions. A good plan for growing water plants is to saw a paraffin barrel in half and immerse it in the garden soil to within an inch or two of the surface, preferably near a tap, or roof-pipe, from which the rain-water can be diverted into the half-barrel. The *Œnanthe* can then be placed in stiff soil in a large pot, and the pot raised about half its height or more above the level of the water by placing bricks under it to raise it to the required level. In the summer it is necessary to protect the pot from the sun's heat, lest the roots become baked and withered. This can be done by placing the pot in a still larger one and filling up the space between the two with *Sphagnum*. Under these conditions the plant will grow and flower. It fruits late in August.

Sambucus nigra is so common that, except for ornamental purposes, or for shade, or for the berries, it is hardly likely to be grown. Given a fairly damp soil it grows only too rapidly. The Canadian species, *S. canadensis*, of which the golden-leaved variety is commonly grown in shrubberies, will only develop the yellow colour well if severely cut back every year. The inflorescence is not a corymbose cyme, as in the common elder, but a paniculate cyme. Of the common elder there are several varieties; one with deeply cut leaflets, and another with leaflets variegated with white are of not infrequent occurrence in gardens, but a yellow-fruited variety is much more rare. The elder flowers in May.

Valeriana officinalis. Like *Œnanthe crocata*, valerian grows well on the sides of ditches or in damp woods, but it does not require to be quite so near the water, and cannot be conveniently grown in a pot on account of its habit of spreading by means of suckers. If the paraffin barrel be allowed to overflow, as it would do, now and then, if placed in connection with a roof pipe, the soil around it would be damp enough for valerian to grow and spread freely. There are two varieties of the plant, of which the one (*sambucifolia*), growing in damp copses, is the commoner. The other (*mikanii*), which is seen on chalky or stiff slaty or calcareous soil, is not easily distinguished when young from the *sambucifolia*, but when the stem has grown the number of leaflets is greater, usually eleven to nineteen, and they are narrower and longer. The only difficulty in growing the plant is that it is bruised or eaten by slugs, also cats will soon find it out and roll on it. This can only be prevented by putting pieces of furze or hawthorn on the soil between the stems, by using a little paraffin occasionally in the watering-pot, or, what is more satisfactory still, except to the cat or the cat's owner, by placing pieces of broken glass edge upwards in the soil. It flowers in August. The pappus at first forms a ring at the top of the ovary, expanding only when the corolla has fallen.

Anthemis nobilis. Camomile prefers a damp peaty soil, and, in a wild state, usually protects its stolons by growing amongst grass. If planted in the open border, two or three pieces can be planted close together so as to make the leaves protect the stolons. It does not grow well in a light or sandy soil unless there is a bed of clay not far beneath so as to retain the moisture. In a shady spot it is apt to grow lanky, and the stem then rots in winter. It flowers in August.

Matricaria chamomilla. This must be grown from seed, some of which can usually be found on the German camomile of commerce. Near London it is a common ballast plant near railways or goods stations, flowering in May, and wild plants can then be easily procured for cultivation, but it is by no means a generally distributed plant. It flourishes best in sandy, well-manured soil, and in a sunny aspect.

Taraxacum officinale. This plant is only interesting to grow on account of the great variation in the form of the leaves and for offering an example of the Ligulifloræ section of Compositæ. Thus the variety *erythrospermum* has deeply cut leaves, with almost linear segments and linear recurved bracts ; var. *palustre*, growing in marshy places, has almost entire leaves, and var. *lævigatum* has ovate-erect bracts and dull green leaves, the typical form having leaves of a bright green colour. It is also of botanical interest, as showing the power of the rootlets, and of the tap-root as it enlarges, to drag the upper part of the root into the soil. Thus, on examination, it will be found that the root is apparently often branched in its upper part, but the branched part will show numerous leaf-scars, indicating that it is the so-called upright rhizome, or, as it may preferably be termed, the root-stock, since it is continuous with the true root, which has become drawn downwards as the stem develops. This action is also easily seen in gentian root.

Menyanthes trifoliata, like *Œnanthe crocata*, can be grown in a pot immersed in water. In its native state it flourishes best in boggy ground, flowering in May. It is interesting among plants of the natural order Gentianaceæ on account of having trifoliate leaves, which are alternate instead of opposite, as is usual in that family.

Atropa belladonna. "Deadly nightshade," as it is called, to distinguish it from the "woody nightshade" (*Solanum dulcamara*), grows in the wild state on chalky hills under the shelter of woods or hedgerows. In places where rabbit dung is abundant and leaf soil present it may reach 8 ft. high or more, though the more usual height is 3 ft. or 4 ft. Under cultivation it is generally grown in the open, and will do well in a heavy or clayey soil, provided it contains lime; nevertheless, it flourishes best under the shade of trees. The root occasionally sends out horizontal suckers, which produce plants around the parent, but the plants are easily grown from seed which has been washed free of pulp on a sieve. There is a yellow-berried variety of this plant, but it is rarely seen in gardens.

Solanum dulcamara. The "woody nightshade" is not particular as to soil so long as there is a fair amount of moisture present, and it prefers shade whilst young. When growing wild, on a pebbly sea-shore, it remains very dwarf, and the same thing occurs on sunny chalky banks. The only disadvantage of growing it in a garden is that, being a perennial, it is liable to carry the potato disease, the same fungus, *Peronospora infestans*, attacking it, and so proving a source of disease to potatoes in the garden. There is a yellow-berried variety of the plant, but it is rare.

Datura stramonium is best grown from seed sown in mild rainy weather in April. Unless sown in very rich soil, the plants remain very dwarf. The plant luxuriates on old manure or rubbish heaps, then grows 2 to 3 ft. high, and 2 to 3 ft. across, and bears numerous flowers. It also requires a warm sunny spot, but where the soil does not become too dry.

Hyoscyamus niger is best grown from seed obtained from wild plants. Commercial seed will not as a rule germinate. Even the seed of the wild plant is very uncertain. If buried too deep, or if it does not receive rain or moisture at the time it should naturally germinate (probably September), it is apt to remain dormant for a whole year until the conditions suit it. This is probably the reason why it often appears at a distance from where it was sown, the earth containing it having been moved, and the seed thus exposed a proper depth to be affected by rain and warmth. It grows equally well in either pure sand or chalk, provided there is plenty of manure or decaying vegetable matter. It is very difficult to transplant. This can only be safely done in the autumn when the leaves wither. If transplanted in the spring it rarely recovers. Slugs and caterpillars are very fond of the young leaves, and often in the autumn a grub will eat away the central bud to the core, and destroy the plant. A small beetle of the turnip-flea kind sometimes perforates the leaves very extensively, and its ravages are best met by planting between the rows of henbane some other plant for which it has a still greater preference. The seeds in the capsules last formed are often deficient in vitality, and the plants produced from them flower the first year, hence the occurrence of annual plants amongst the biennial. To secure strong biennial plants the first formed seed pods should be chosen. The uncertainty of germination and the many enemies of henbane render the crop a very uncertain one, hence the high price of the leaves. There are two varieties which may sometimes be seen growing side by side. One of these has narrow leaves and an erect scarcely-branched stem which gives it at a distance a resemblance to a thistle. The other has broader leaves and a branched inflorescence.

Juniperus communis will grow on chalky or sandy soil, but requires it to be damp, and if sandy, plenty of leaf mould is necessary.

Juniperus sabina is rather slow growing, it requires a sunny position, but should not be allowed to get dry at the root. It is easily propagated by inserting a branch deeply in the soil in late autumn and pressing the soil firmly around it.

Taxus baccata. The most convenient form to grow in a garden, as it fruits while only a few feet high, is the erect or Irish yew, *Taxus baccata* var. *fastigiata.* It is by no means particular as to soil or aspect, although it is a chalk lover, and where chalk is not procurable a little whiting mixed with the soil will be advantageous.

Aspidium filix-mas is a very hardy fern, and will, like *Polystichum aculeatum* and *P. lobatum,* flourish in drier situations than most ferns. But it is more luxuriant when there is a moist atmosphere and shelter from wind; hence ferns are sometimes seen in a flourishing condition in the kitchen areas of London houses.

Metal Polishes. (*Amer. Drugg.*, 264.) *White Polishing Paste.* A paste adapted for almost any kind of metallic surface is made by incorporating kieselguhr or precipitated silica with heavy petroleum oil, as in the following formula: Paraffin wax, 2 oz.; liquid petrolatum, 6 oz.; crude oleic acid, 4 oz.; kieselguhr or precipitated silica, 8 oz.

Liquid Metal Polish. A liquid polish well adapted for heavy work is made as follows: Rotten stone, ℥iv.; ferric oxide, ℥xij.; liquid petrolatum, ℥xx. The powders should be in a fine state of subdivision and mixed intimately before the liquid petrolatum is added.

Nail Bleach. (*Amer. Drugg.*, **45**, 408.) Tartaric acid, 1 dr.; tincture of myrrh, 1 dr.; eau de Cologne, 2 drs.; distilled water, 3 fl. oz. Dissolve the acid in the water, mix the tincture of myrrh and eau de Cologne and add to the acid solution. The nails are dipped in this solution and afterward wiped and polished with a chamois leather.

Neutral Tooth Powders. — Mathis. (*Nouv. Remédes*, **21,** 45.) (1) Calcium carbonate, 60 Gm.; quinine sulphate, 2 Gm.; saponin, 0·20 Gm.; oil of peppermint, 20 drops; carmine, a sufficient quantity to colour.

(2) Potassium chlorate, 20 Gm.; powdered starch, 60 Gm.; carmine, 4 Gm.; saccharin, dissolved in alcohol, 0·10 Gm.; vanillin, 0·15 Gm. The second powder is specially recommended for sore gums.

Origin of the Potato. E. Heckel. (*Comptes rend.*, **139,** 887.) *Solanum commersoni* is considered to be at least one of the parent plants from which the cultivated *Solanum tuberosum* has been derived. Five small tubercles of *S. commersoni* received in 1896 from Uruguay, cultivated for 7 years in dry marly soil remained permanent to type, producing tubers covered with lenticels. attached to the end of long stolons, having a greenish, waxy, bitter pulp. But when some of these were planted out, in 1901, in damp soil they soon began to show signs of modification. In 1902 and 1903, three varieties were obtained from these; one with violet tubers, the other rose coloured, and the third white. The character of the plants had also undergone a change; tubers were no longer formed singly at the end of long stolons, but were aggregated at the base of the stem. The tubers had lost their lenticels; they contained a greater percentage of starch, and were larger. At the same time fruit had ceased to form abundantly. Further cultivation of these varieties in moist soils, particularly the violet form, gave most satisfactory results. The plants were very robust, growing haulm as long as 4 metres, while the flowers resembled those of the ordinary potato, and the fruits acquired the characteristic spheroid shape. Ultimately it was impossible to differentiate between the tubers obtained and those of the "North Star" or "Early Rose" potatoes of ordinary culture. The violet variety should prove of exceptional value, especially for cultivation in marshy land, since it grows best in damp soils, where it has given a crop of 63,000 kilos to the hectare, about 25 tons 9 cwts. to the acre.

Paraffin and Walnut Hair Stimulant. F. E. Niece. (*Drugg. Circular*, 49, 223.) Moisten half an ounce of dried green walnut shells with alcohol, and then digest them on a sand bath, with 30 grs. of powdered alum, in 2 oz. of liquid paraffin; when cool, add 5 drops of essential oil of nutmeg.

Paraffin Furniture Polish. F. E. Niece. (*Drugg. Circ.*, 49, 224.) Solid paraffin, 3½ oz.; amber petrolatum, 1 oz.; solution of caustic potash 5 per cent., 2½ drs.; kerosene, 10 oz.; alkanet, 1 oz. Heat the potash with the paraffin and petrolatum, add the alkanet root, digest, strain, and stir the kerosene in until cool. Bottle in wide-mouthed bottles or in jars.

Paraffin Hair Preparations. F. E. Niece. (*Drugg. Circ.*, 49, 224.) (1) Paraffin oil, 1 pint; alkanet root, 1 dr.; oil of cloves, 15 drops; oil of rose, 2 drops; oil of bergamot, 1 dr. Rub the alkanet into coarse powder, moisten with alcohol, and digest on a sand bath for half an hour with the paraffin, filter, then add perfumes when cool.

(2) Paraffin oil, 1 pint; cottonseed oil, ½ pint; oil of cloves, 15 drops; oil of cassia, 10 drops; oil of nutmeg, 30 drops. Warm the paraffin and cottonseed oils on a bath, filter, and add the other oils after cooling.

Brilliantol. A dressing for the moustache, eyebrows, and hair. Liquid paraffin, 6 oz.; glycerin, 2 oz.; oil of bitter almonds, 8 drops; oil of rose, 1 drop. Mix the first two and add the others. Shake well before using.

Paraffin Rouges. F. E. Niece. (*Drugg. Circ.*, **49,** 224.)

(1) *Natural Rouge.* Solid paraffin, 1 oz.; white petrolatum, 1½ oz.; eosin dye, 1 dr.; oil of bitter almonds, 5 drops. Heat the paraffin and petrolatum on a sand bath, digest the eosin, stirring for a half-hour, allow to settle, strain; when cold, add the oil, mix, and pour into jars.

Directions for Use. Apply with the finger tips, thoroughly rubbing until desired tint is produced. Allow to remain a few minutes, then remove surplus of grease with a soft cloth. It leaves a tint not affected by moisture, water or perspiration.

(2) *Stronger Rouge.* Solid paraffin, 1 oz.; white petrolatum, 1 oz.; glycerin, ½ oz.; eosin, ½ dr.; oil of rose, 2 drops. Melt the paraffin and petrolatum, add the glycerin and eosin and stir until cool; add the oil and mix until hard.

Used for tinting the lips a deep pink in theatrical "making up."

Pastor Kneipp's Pills. (*Amer. Drugg.*, **45,** 117.) Extract of rhubarb, 16 grs.; extract of Cape aloes, 64 grs.; powdered rhubarb, 16 grs.; powdered castile soap, 16 grs.; powdered fenugreek, 5 grs.; powdered dwarf elder root, 5 grs.; powdered fennel, 5 grs.; powdered juniper, 5 grs. Mass and divide into 60 pills. Three or four to be taken in the morning or evening.

Perfumed Paraffin Cakes. F. E. Niece. (*Drugg. Circ.*, **49,** 224.) Used by rubbing on cloth, clothes and handkerchief. Paraffin, 1 oz.; white petrolatum, 2 oz.; heliotropin, 10 grs.; oil of bergamot, 5 drops; oil of lavender, 5 drops; oil of cloves, 2 drops. Melt the first two substances, then add the next, the oils last, and stir all until cool, allowing to settle; then cut into blocks and wrap in tin foil. (Obviously other essential oils may be used to reproduce any desired perfume.)

Petrolatum Cosmetic Soap Paste. F. E. Niece. (*Drugg. Circ.*, **49,** 224.) A permanent soap combining the properties of cleansing and lubrication. It lathers well with water, and cleanses, whitens and softens the skin. Amber petrolatum, ½ oz.; powdered castile soap, 2½ drs.; sodium carbonate (dry), 40 grs.; stearic acid, 80 grs. Dissolve the carbonate in a little water, add to the acid on a sand bath, heat until reaction is complete, then add the soap and lastly the petrolatum, continuing the heat and stirring until no more foam is produced. Cool and put into suitable containers.

Phosphorescent Preparations and Masses. L. Vanino and J. Gaus. (*Journ. prakt. Chem.*, **71,** 196.) (1) *Lennard's Mass.* Strontium carbonate, 100 Gm.; sulphur, 100 Gm.; potassium chloride, 0·5 Gm.; sodium chloride, 0·5 Gm.; manganous chloride, 0·4 Gm. By heating the mixture for three-quarters of an hour at about 1,300°C. a product is obtained which emits a fine golden yellow light.

(2) *Mourelo's Mass.* Strontium carbonate, 100 Gm.; sulphur, 30 Gm.; sodium carbonate, 2 Gm.; sodium chloride, 0·5 Gm.; manganous sulphate, 0·2 Gm. This mass emits a bright yellow light.

(3) *Vanino's Mass.* Strontium thiosulphate, 60 Gm.; bismuth nitrate, 12 c.c. of a 0·5 per cent. solution in acidified alcohol; uranium nitrate, 6 c.c. of a 0·5 per cent. alcoholic solution. By heating the mass for three-quarters of an hour at about 1,300°C., a product is obtained which emits an emerald-green light.

(4) *Balmain's Mass.* Calcium oxide (iron-free), 20 Gm.; sulphur, 6 Gm.; starch, 2 Gm.; bismuth nitrate, 1 c.c. of a 0·5 per cent. solution; potassium chloride, 0·15 Gm.; sodium chloride, 0·15 Gm. The mass after being heated emits a violet light.

Picric Acid for Chilblains. P. Lemaire. (*Répertoire* [3], **16,** 543.) Unbroken chilblains may be rapidly cured by the application of a 1 per cent. solution of picric acid; Esbach's reagent, composed of picric acid, 1; citric acid, 2; water, 100, answers the purpose admirably. Under this treatment the itching, swelling, and tenderness quickly disappear.

Powdered Almond Shells as an Adulterant of Alimentary Substances. E. Collin. (*Journ. Pharm. Chim.* [6], **20,** 101.) It would appear that the production of powdered almond shells for fraudulent admixture with various food stuffs is assuming the proportion of an important industry, the manufacturers of this substance going so far as to publish testimonials from so-called chemists attached to Hygienic Societies, and even from graduates of some Universities. This powder is ground to three degrees of fineness, according to the purpose for which it is to be used. The first, ground to pass a 180 hole sieve, is of bright colour, resembling powdered cinnamon; the second, about 100 fineness, is in appearance very like the majority of powdered drugs. The third grade is darker and coarser, resembling granulated powders in appearance. These powders are perfectly devoid of taste and odour. Figures of the distinctive histological elements, as shown by the microscope, of this serious adulterant are given. The chief use of the powder appears to be for the adulteration of cocoa, chocolate and biscuits.

Pure Cultures of Diatoms. O. Richter. (*Nat. Drugg.*, **35,** 119, after *Deutsche Botanisch. Berichte.*) The author has succeeded in obtaining pure cultures of diatoms (*Nitzscia palea* and *Navicularia minuscula*) as follows :—

The medium consists of jelly prepared from ordinary commerical agar-agar, kept from 2 to 3 days under running water, and then for 1 day in distilled water, frequently renewed and then dissolved. It was rendered sterile to bacteria by the addition of the salts of Knop's nutrient medium (calcium sulphate, sodium nitrate, and magnesium nitrate). The diatoms could be seen, even with the naked eye, after the tenth day, building colonies on the surface of this medium. Both of these diatoms have the property of liquifying not only gelatin, but agar-agar. Later experiments demonstrated that calcium sulphate might advantageously be left out of the culture medium. In gelatin cultures the sodium nitrate is found to be of little or no use, while magnesium nitrate was found indispensable. It is hoped that this successful experiment will pave the way, and by changes of media, etc., the successful culture of all diatoms will be possible.

Raspberry Shrub. (*Drugg. Circular*, **49,** 241.) Vinegar, 1 quart ; raspberries, 3 quarts. Place in a dish, and after they have stood a day, strain and add a pound of sugar to each pint of liquid. Boil for half an hour and skim. When it is cool, add 1 ounce of brandy to each fl. oz. of shrub.

Sachet Powders. (*Drugg. Circ.*, **49,** 187). *Violet.*—(1.) Orris root, 6 oz. ; red rose petals, 2 oz. ; benzoin, 2 oz. ; musk (Tonquin), 8 grs. ; bitter almond oil, 2 ♏.

(2) Orris root, 6 oz. ; musk, 8 grs. ; vanillin, 30 grs. ; oil of rose, 25 drops ; oil of petit grain, 150 grs. ; Cologne water, 3½ oz. The materials should be fresh and the powder should be rather coarse, as, when fine, the fragrant portions escape too rapidly.

To make a fine article, a few drops of ionone may be added to the above.

Heliotrope. (1) Rose leaves, 2 oz.; orris root, 1 oz.; lavender flowers, 1 oz.; Tonka beans, 2 drs.; benzoin, 1 dr.; musk, 5 grs.; oil of bitter almond, 3 drops; oil of sandal, 30 drops; oil of neroli, 10 drops.

(2) Orris root, 10 oz.; rose leaves, 7½ oz.; Tonka beans, 5 oz.; vanilla beans, 1½ oz.; musk, 24 grs.; oil of bitter almond, 50 ♏.; alcohol, ½ oz.

Carnation pink. Tonka beans, 2 drs.; pimento, 1 dr.; patchouly leaves, ½ oz.; lavender flowers, 1 oz.; orris root, 1 oz.; oil of cloves, 5 drops; oil of rose, 10 drops; oil of neroli, 10 drops; oil of sandalwood, 20 drops.

[The substitution of isoeugenol for the clove oil gives the powder a truer "pink" odour.—ED. *Year-Book.*]

Saponin, Toxicity of, and its Employment as an Emulsifying Agent. N. G. Keirle, junr., and H. A. B. Dunning. (*Proc. Amer. Pharm. Assoc.*, **52,** 402.) Rabbits, dogs and guinea-pigs were experimented with, both by oral and hypodermic treatment. Rabbits were found to be markedly less affected than the other animals. After doses ranging from ¼ to 3 grs., the rabbits became at first excited, then dull, and the respiration was affected. Only one died, and that probably from other causes. Of five guinea-pigs treated with doses ranging from ⅛ gr. to 2 grs., all died; and three dogs were killed by 4 gr. doses. In all these animals post-mortem examination showed an œdematous state of the brain and a peculiar toughening and anæmic condition of the lungs. It is evident that saponin has a marked toxic action, and that it affects the organs of respiration. Saponin has been detected in certain commercial emulsions; but it is a question as to how much may be present, and what would constitute a harmful dose. H_2SO_4 slightly coloured with $K_2Cr_2O_7$ gives a green colour with a very dilute solution of saponin, and H_2SO_4 containing 1 drop of $N/_{10}$ $KMnO_4$, the solution being of a brownish red, gives a cherry red colour with the same. (See also *Year-Book,* **1904,** 241.)

Stain Removing Soaps. (*Nat. Drugg.*, **34,** 253.) (1) Coconut or palm oil, 320; caustic soda solution (sp. gr. 1·36), 160; potassium carbonate solution (sp. gr. 1·16), 56; oil of turpentine, 9; finely powdered kieselguhr, 280; brilliant green, 2. Melt the oil, mix the dye with it, and sift in the kieselguhr, then add the soda and potash. When saponification commences, add the turpentine. (2) Resin soap, 1,000; talc made into a paste with weak potassium carbonate solution, 100; turpentine oil, 4; benzine, 3. Melt the soap, and mix in the talc. When cool, add the benzine and turpentine, avoiding proximity to naked lights. (3) Coconut oil, 600; tallow, 400; caustic soda lye (sp. gr. 1·36), 500; ox-gall, 200; turpentine oil, 12; solution of ammonia (sp. gr. 0·910), 6; benzine, 5. Saponify with heat, cool, and add the other ingredients with the usual precautions.

Substitute for Rubber Gloves, A. (*Journ. Amer. Med. Assoc.*, through *Nat. Drugg.*, **34**, 449) Murphy has found that a 4, 6, or 8 per cent. solution of guttapercha in benzine, when applied to the hands of the surgeon or the skin of the patient, will seal these surfaces with an insoluble, impervious, and practically imperceptible coating which will not allow the secretions of the skin to escape, and will not admit secretions, blood, or pus into the crevices of the skin. At the same time, it does not impair the sense of touch nor the pliability of the skin. A similar solution in acetone also meets most of the requirements.

Murphy's routine method of hand preparation is as follows: First, 5 to 7 minutes' scrubbing with spirit of soft soap and running hot water; second, 3 minutes' washing with alcohol; third, when the hands are thoroughly dried, the guttapercha solution is poured over the hands and forearms, care being taken to fill in around and beneath the nails. The hands must be kept exposed to the air with the fingers separated until thoroughly dry. The coating is very thin, and can be recognized only by its glazed appearance. It will resist soap and water, but is easily removed by washing in benzine. The hands can be washed in bichloride or any of the antiseptic solutions without interfering with the coating or affecting the skin. If the operations be many, or prolonged, the coating wears away from the tips of the fingers, but is easily renewed. For the remaining portion of the hands one application is sufficient for a whole morning's work.

The 4 per cent. benzine solution of rubber wears better on the tips of the fingers in handling instruments, sponges, and tissues than the acetone solution.

For the abdomen the acetone solution has the advantage, as it dries in 3 to 4 seconds after its application, while the benzine solution takes from 3 to 4½ minutes to make a dry, firm coating.

The preparation of the patient's skin consists in 5 minutes' scrubbing with spirit of soft soap, washing with ether, followed by alcohol. The surface is then swabbed over thoroughly with the benzine or acetone solution.

The guttapercha solution is prepared by dissolving the pure guttapercha chips in sterile benzine or acetone. These solutions do not stand boiling, as this impairs the adhesiveness and elasticity of the coating.

Synonyms of Magnesium Sulphate. M. T. Wilbert. (*Proc., Amer. Pharm. Assoc.*, **52,** 345.) The following English and Latin synonyms have been given to magnesium sulphate: *Magnesia vitriolata, sal amarum, sal Seidlicense, sal Seidlitzense, sal Seidschuetzense, sal Anglicum, sal catharticum, sal Ebschaniense, sal Ebsomiense*; magnesium sulphate, bitter salt, bitter laxative salt, bitter purging salt, cathartic salt, English salt, Epsom salt, physical salt, laxative salt, sulphate of magnesia, and vitriolated magnesia.

Tapeworm, Remedy for. (*Pharm. Centralh.*, **45,** 678, *Remédes.*) Pumpkin seeds, 620 grs.; freshly prepared extract of pomegranate root, 155 grs. Make a paste and divide into 20 equal parts, which may be given in capsules if desired, and flavoured with peppermint or lemon oil. Every half-hour 5 of these portions are to be taken, in the morning, fasting, and half an hour after the last 5, a purge consisting of equal parts of syrup of buckthorn and brandy should be taken. Tea or broth may then be taken. For delicate patients or children the dose should be lessened.

Thymol Dentifrice, Miller's. (*Journ. Pharm. Chim.* [6], **21,** 48.) Thymol, 3; benzoic acid, 30; tincture of eucalyptus, 150; alcohol 90 per cent., 1,000; essential oil of peppermint, 7·5.

Toad Venom, Action of Radium Emanations on. C. Phisalix. (*Journ. Pharm. Chim.* [6], **20,** 379.) Although the venom of snakes is very sensitive to radium emanations, and rapidly loses its toxicity under their influence, the same is not the case with the venom of the toad or of the salamander. The active principle of these two venoms is not an albuminoid, so it is inferred that the chemical action of radium rays is only exerted on albuminous bodies. Toad venom may be kept for several days in a radioactive atmosphere without showing the least diminution of its virulence.

Toilet Ammonia. (*Amer. Drugg.*, **45**, 48.) Solution of Ammonia, 250 c.c.; soft soap, 120 Gm.; oleic acid, 10 c.c.; bay oil, 1 c.c.; rosemary oil, 1 c.c.; verbena oil, 5 c.c.; water, sufficient to make 1,000 c.c. Dissolve the oleic acid in the ammonia water and the soap in 500 c.c. of warm water, to which add the oils. Mix both by agitation and add water to make 1,000 c.c.

To Quickly Remove a Ring from a Swollen Finger. (*Nat. Drugg.*, **35**, 145.) If the ring is of gold, pull the folds of the swollen muscles apart, so that it can be seen, then drop on it a little absolute alcohol and place the finger in a bowl of metallic mercury. In a very few minutes the ring will snap apart. If the ring is of brass, scrape the surface slightly, or put on a few drops of a solution of oxalic acid, or even strong vinegar; let remain in contact for a moment or two, then put into the mercury, and the result will be as before.

Toxicity of Essential Oils and their Constituents on the Living Cell. A. J. J. Vandevelde. (*Bull. Assoc. Belges de Chim.*, through *Schimmel's Report, Oct.*, **1904**, 102.) The toxicity of the substances examined was compared with that of absolute alcohol, as affecting plasmolysis in the living cell. Phenols and aldehydes are found to be much more toxic than the alcohols, as shown by the following comparative figures: Thymol, 0·04; menthol, 0·18; cinnamic aldehyde, 0·20; cassia oil, 0·21; clove oil, 0·21; thyme oil (white), 0·36; Ceylon cinnamon oil, 0·44; thyme oil (red), 0·60; peppermint oil, 1·52; nutmeg oil, 1·77; star-anise oil, 1·81; carvone, 2·06; bitter almond oil, 2·26; benzaldehyde, 2·26; caraway oil, 5·40; lemon oil (terpeneless), 6·45; neroli oil, 7·11; carvene, 7·71; angelica oil (root), 7·84; anise oil, 10·33; cognac oil (artificial), 13·83; anethol, 17·08; lemon oil, 18·55; cognac oil, 18·89; isobutyl alcohol, 21·20; propyl alcohol (normal), 45·50; ethyl alcohol, 100·00; methyl alcohol, 142·10.

Toxicity of the Red Blood Corpuscles of Various Animals on the Rabbit. F. Batelle. (*Journ. Pharm. Chim.* [6], **20**, 143.) The constituents of the red blood-corpuscles of the dog, cat, ox, and rabbit have no toxic effect when injected into the veins of rabbits, and these blood-corpuscles are not hæmolyzed by the blood serum of the rabbit. But the contents of the blood corpuscles of the pig, sheep and rat are toxic when so given, and rabbit's-blood serum causes the hæmolysis of the red corpuscles of the blood of these animals. Of these, pig's blood is most toxic.

Universal Healing Salve. (*Amer. Drugg.*, **46,** 172.) Salicylic acid, 4 drs.; ichthyol, 1 oz.; precipitated sulphur, 5 oz.; zinc oxide, 5 oz.; pine tar, 5 oz.; petrolatum, 10 oz.; oil rosemary, 2 fl. drs. Mix. Any other flavouring oil may be substituted for the rosemary, which is only added to give the mixture an agreeable odour.

Velvet Violet Powder. Orris root, 2 oz.; corn starch, 12 oz.; lycopodium, 1 oz.; oil of orange flowers, ½ dr.; oil of bergamot, ½ dr.; oil of lavender flowers, ½ dr.; oil of cloves, 15 drops; oil of cinnamon, 15 drops. Mix all the powders and all the oils, then gradually add the oils to the powders.

White Library Paste. (*Drugg. Circ.*, **34,** 453.) Tragacanth, 2; white dextrin, 1; wheat flour, 6; glycerin, 1; cold water, 4; boiling water, 40 parts. Over the tragacanth pour 16 parts of water in active ebullition, stirring it in well, and set aside in a moderately warm place. Mix the wheat flour and dextrin with the cold water, and add the mixture to the tragacanth, stirring in thoroughly, and pour the batter thus formed into the boiling water (24 parts), stirring actively and constantly while this is being done. Now add to the glycerin sufficient salicylic acid (say about a quarter of one part, or sufficient to constitute about the half of 1 per cent. of the entire batch of paste) to preserve the paste, and pour the mixture into the boiling mass. Let boil for 4 or 5 minutes under constant stirring, then remove from fire and pour into a stone jug or jar, cover with a piece of bladder, and tie tightly. Keep in a cool place, and when the paste is needed, after removing a portion, replace the cover, tightly tying down. The product is pure white and almost odourless, a faint pleasant smell only remaining. As a sticker for paper or cloth this is unequalled. It is improved by the addition of 2 parts of gum arabic and 3 additional parts of glycerin (making four in all), which converts it into an excellent label paste. The substitution of good glue for gum arabic, and the addition of 8 parts of sugar, makes a good all-round paste for use on leather, wood, glass or metal.

RESEARCH LIST, 1905.

THE following subjects are suggested for investigation, and the Executive Committee hopes that members of the B.P.C. will undertake to work on one or more of these questions. New subjects have been added to the list to replace those worked out. The Hon. Secretaries wish to call attention to the fact that a special fund has been raised to defray expenses connected with research work. The Executive Committee will be glad to receive applications from members for grants from the above fund.

PLANT ANALYSIS.

1. *Arnica.* What is the active principle, and what are the relative proportions of it in the root and flower? (*See Year-Book*, **1904**, 27.)

2. *Bay Berries.* An examination of the bitter principle of the pericarps of bay berries is required.

3. *Cascara Sagrada.* What is the nature of the various resins contained in the bark? The cascara sagrada of commerce apparently consists of two species, *R. purshiana* and *R. californica*, the latter having a much paler fracture. It is desirable to ascertain how far these differ in activity, percentage of active principles, yield of extract, etc. (See *Year-Book*, **1893**, 131; **1899**, 134; **1905**, 56.)

4. *Castor Oil.* A research having for its object the isolation of a purgative principle is required. (See *Year-Book*, **1898**, 163; 184; **1901**, 125. *Pharm. Journ.* [4], **5**, 84; **11**, 152.)

5. *Chamomile.* Research upon the bitter principle of *Anthemis nobilis.* (See *Bull. de Soc. Chim.* [2], **41**, 483; *Year-Book*, **1904**, 266.)

6. *Cimicifuga racemosa* (*Actæa racemosa*). Further information is needed on the chemical nature of the constituent or constituents to which the rhizome of the plant owes its activity. (See *Year-Book*, **1885**, 149.)

7. *Damiana* is reported to contain a bitter substance, resins, and volatile oil. The liquid extract of the leaves being ex-

tensively used, a thorough systematic examination of this drug is desirable.

8. *Determinations* of the total quantity of alkaloids in certain plants, such as belladonna, at *different stages of growth* would be useful.

9. *Euphorbia pilulifera.* Required, a report upon the chemistry of this drug.

10. *Fucus vesiculosus.* The medicinal virtues have been attributed solely to the presence of iodine and bromine. It is not improbable that it may contain some organic constituent of importance. A complete chemical investigation is required.

11. *Mezereon Bark.* What is the chemical nature of the acrid principle of this bark ?

12. *Papaver rhœas.* An examination of the red colouring matter of the petals is required.

13. *Simarouba Bark.* A comparison of the constituents of this drug with those of quassia wood is desirable.

14. *Strophanthus.* Information is desirable on the best methods of separating the different active principles obtained from strophanthus seeds. (See *Year-Book,* **1898,** 54, 162 ; **1899,** 59 ; **1901,** 167 ; also *Pharm. Journ.* [4], **6,** 385, 506.)

15. *Taraxacum.* To what constituents are the cholagogue and diuretic properties due ? To what extent do they vary in roots collected at different seasons of the year ?

16. *Veratrine.* Should a pure veratrine be included in the British Pharmacopœia rather than the mixture of alkaloids now official ? If so, suggest a process for its purification.

17. *Proximate Analyses* of the following drugs are required : *Cereus grandiflorus, Citrullus colocynthis, Cassia fistula* and *Serenoa serrulata* (Saw Palmetto).

CHEMISTRY.

18. *Adeps.* A satisfactory test for the presence of cotton seed oil is needed. A good test for lard oil is required.

19. *Apomorphine.* Do solutions of this alkaloid retain their potency after coloration has taken place ?

20. *Cinnamon Bark Oil.* The official physical and chemical tests are stated to be unsatisfactory. Investigation of authentic specimens of oil from bark and " chips " suggested. (See *Year-Book,* **1904,** 58.)

21. *Cotton Wools.* How far do commercial samples conform to the tests of the British Pharmacopœia ?

22. *Ferri Arsenas.* The official tests supply only the means of determining the amount of ferrous iron present. It has been suggested that a method for the determination of the arsenic content should be ordered. (See *Pharm. Journ.* [4], **7,** 530 ; *Year-Book,* **1903,** 572; **1905,** 81.)

23. *Glycerin.* Required a good method for determining this substance, applicable if possible to pharmaceutical preparations.

24. *Ipecacuanha.* Experiments upon the method or methods for the separation of the alkaloids are needed.

25. *Sodium Arsenate.* A better method of assay than that now official would be welcome. (See *Year-Book,* **1904,** 166.)

26. *Tannins.* The various methods employed for the estimation of tannin in astringent drugs and preparations give very discrepant results. Required, a thorough research into the comparative result of these processes.

PHARMACOPEDY AND PHARMACY.

27. *Botanical Sources* of the following require investigation. The varieties of asafetida and galbanum; the gum resin opoponax; the co-called Syrian tragacanth; the large licorice root imported from Bussorah (probably *Glycyrrhiza echinata*), and the varieties of copaibas of commerce.

28. *Cannabis indica.* Preparations of uniform strength of this drug are needed. Experiments are required as to the best method of preparation. Experiments are also needed to determine the difference in yield of resin, cannabin, and cannabinol between the guaza of Bombay and the ganjah of Calcutta.

29. *Compressed Drugs and Coated Pills.* Required, a report on the strength and quality of the compressed drugs and coated pills of commerce.

30. *Effect of Cultivation, Soil, Climate, and Time of Collection on Medicinal Plants.* Compare the proportions of active constituents of indigenous plants grown in different districts, and the effect upon those constituents by variations in the time of collection.

31. *Ergot.* The determination of the proportion of active principles extracted from ergot by the official processes for the various preparations.

32. *Extractum Taraxaci Liquidum.* The specific gravity and proportion of solid residue appear to vary much in commercial specimens. To what is this variation due ?

33. *Galenicals.* The action upon these of light and ordinary exposure in a pharmacy.

34. *Hamamelin.* Should this be prepared from the leaves or the bark? Experiments on the relative efficacy of powdered extractives from the two parts of the plant are desirable.

35. *Jaborandi.* The leaves as imported are much mixed with stalks. Should the leaves be completely separated from the stalks for the making of official preparations? What is the alkaloidal strength of old leaves, young leaves, and stalks?

36. *Licorice.* An examination of commercial samples of "Block Juice" and "Stick Licorice," with reference to their purity and glycyrrhizin content would be of value.

37. *Liquor Sennæ Concentratus.* In this preparation the senna is exhausted by repercolation; in the liquor for preparing syrupus sennæ, B.P., a process of double maceration is employed. Which is the better method?

38. *Olive Oil.* It has been suggested that for galenical preparations purified cotton seed oil, arachis oil, or sesame oil might be substituted for olive oil. A series of plasters, liniments, ointments, etc., should be prepared with each of those oils, and the resulting products compared.

39. *Oxydase.* The action of this and other ferments in inducing changes in galenical preparations such as liquid extracts, etc. requires investigation.

40. *Pepsin.* A good method of assay—determining the peptonizing and not merely dissolving power of pepsin, suitable for inclusion in B.P., is wanted. (See *Pharm. Journ.* [4], **5**, 561; *Year-Book,* **1904**, 138; also Mette's test in Schäfer's *Physiology.*)

41. *Powdered Drugs.* The determination of the limits within which adulteration of powdered drugs can be determined under the microscope.

42. *Suppositories.* A compilation or determination of the specific gravity of the medicaments more commonly prescribed in suppositories in order that correct allowance may be made for the volume of the same. (See *Pharm. Journ.* [4], **5**, 437; [4], **6**, **69**.)

TRANSACTIONS

OF THE

British Pharmaceutical Conference

AT THE

FORTY-SECOND ANNUAL MEETING

IN

BRIGHTON,

1905.

CONTENTS.

CONSTITUTION AND RULES OF THE CONFERENCE.

ALPHABETICAL LIST OF MEMBERS' NAMES AND ADDRESSES.

PROGRAMME OF TRANSACTIONS OF THE CONFERENCE IN BRIGHTON, INCLUDING TITLES OF PAPERS.

THE TRANSACTIONS OF THE CONFERENCE, INCLUDING THE PAPERS READ AND DISCUSSIONS THEREON.

GENERAL INDEX TO THE YEAR-BOOK AND TRANSACTIONS.

British Pharmaceutical Conference.

CONSTITUTION

Art I —This Association shall be called The British Pharmaceutical Conference, and its objects shall be the following —

1. To hold an annual Conference of those engaged in the practice or interested in the advancement, of Pharmacy, with the view of promoting their friendly reunion, and increasing their facilities for the cultivation of Pharmaceutical Science
2. To determine what questions in Pharmaceutical Science require investigation, and when practicable, to allot them to individuals or committees to report thereon
3. To maintain uncompromisingly the principle of purity in Medicine
4. To form a bond of union amongst the various associations established for the advancement of Pharmacy, by receiving from them delegates to the annual Conference

Art. II —Membership in the Conference shall not be considered as conferring any guarantee of professional competency

RULES.

1 Any person desiring to become a member of the Conference shall be nominated in writing by a member, and be balloted for at a general meeting of the members, two thirds of the votes given being needful for his election If the application be made during the recess, the Executive Committee may elect the candidate by a unanimous vote

2. The subscription shall be 7*s* 6*d* annually, which shall be due in advance upon July 1.

3 Any member whose subscription shall be more than two years in arrear, after written application, shall be liable to be removed from the list by the Executive Committee Members may be expelled for improper conduct by a majority of three fourths of those voting at a general meeting, provided that fourteen days' notice of such intention of expulsion has been sent by the Secretaries to each member of the Conference.

4 Every association established for the advancement of Pharmacy shall during its recognition by the Conference, be entitled to send delegates to the annual meeting

5 The Officers of the Conference shall be a President, a number of Vice presidents not exceeding six, by election, the past Presidents (who shall be Vice-presidents), a Treasurer, two General Secretaries, one local Secretary, and nine other members, who shall collectively constitute the Executive Committee. Three members of the Executive Committee to retire annually by ballot, the remainder being eligible for re-election They shall be elected at each annual meeting, by ballot of those present

6. At each Conference it shall be determined at what place and time to hold that of the next year.

7. Two members shall be elected by the Conference to audit the Treasurer's accounts, such audited accounts to be presented annually.

8. The Executive Committee shall present a report of proceedings annually

9 These rules shall not be altered except at an annual meeting of the members

10 Reports on subjects entrusted to individuals or committees for investigation shall be presented to a future meeting of the Conference, whose property they shall become All reports shall be presented to the Executive Committee at least fourteen days before the annual meeting

⁂ *Authors are specially requested to send the titles of their Papers to The Hon Gen Secs Brit Pharm. Conf, 17, Bloomsbury Square, London, W C, two or three weeks before the Annual Meeting The subjects will then be extensively advertised, and thus full interest will be secured.*

FORM OF NOMINATION

I Nominate

(Name)

Address)

as a Member of the British Pharmaceutical Conference.

Member

Date

This or any similar form must be filled up legibly, and forwarded to *The Asst. Secretary, Brit. Pharm. Conf.*, 17, Bloomsbury Square, London, W C., who will obtain the necessary signature to the paper.

Pupils and Assistants, as well as Principals, are invited to become members.

HONORARY MEMBERS.

Ebert, A. E., 426, State Street, Chicago, Illinois, United States.

Ladenburg, Albert Ph.D., Hon M.D., Professor of Pharmacy, University of Breslau, 108, Kaiser Wilhelm-Strasse, Berlin.

Maiden, Joseph Henry, F L.S., Director of Botanic Gardens and Government Botanist, Sydney, N.S.W.
Mello, J. C. de, Campinas Brazil.

Petit, A., Rue Favart, 8, Paris.
Prain, David, Major, I.M.S., M A., M B., LL.D (honoris causâ), Director of Botanical Survey, Royal Botanic Gardens, Shibpur, near Calcutta.

Remington, J. P., Professor of Pharmacy. College of Pharmacy, 145, North Tenth Street, Philadelphia, United States.

Saunders, W., London, Ontario, Canada.
Schacht, C., Ph.D., 56, Mittelstrasse, Berlin, Germany.

Tschirch, Prof. Dr. A., Direktor des Pharmazeut. Institutes, Der Universität, Berne, Switzerland.

FOREIGN AND COLONIAL MEMBERS.

Abbott, G. W. A., St. Vincent Street, Port of Spain, Trinidad.
Aerstin, Edw. Chas., Colonial Dispensary, Port of Spain, Trinidad, W. I.
Aickin, G., The Pharmacy, Queen Street, Auckland, N.Z. (Year-Book to Evans Sons, Lescher & Webb, Ltd., Bartholomew Close, E.C.).

Backhouse, H. N., 5, Rue de la Paix, Paris.
Baker, C. F., Smith, Stanistreet & Co., Calcutta.
Barcham, J N., Allan Street, Kyabram, Victoria.
Barrett, Arthur A., Pozzo Leone 31, Messina.
Bay, A. H., Medical Hall, Rangoon, Burmah.
Bemrose, J., F.C.S., F.I.C., 56, St. Famille Street, Montreal (Year-Book to Horner & Sons, Mitre Square, E.C.).
Boesinger, John, Nilgiri Pharmaceutical Co., Ootacamund, India.
Branch, G. T., c/o Mr. Cleghorn, Hout Street, Cape Town.
Brinsmead, J. T., High Street, Traralgon, Victoria.
Brownscombe, W. J., Bridge Road, Richmond, Melbourne.
Butcher, C., Sydney, New South Wales.

Champion, G. A., Durban, Natal (Year-Book to Maw, Son & Sons, 11, Aldersgate Street, E.C.).
Chapman, W. H., Corner of St. Catherine and Guy Streets, Montreal, care of Lyman & Co. (Year-Book to Horner & Sons, Mitre Square, E.C.).

Coaker, Norwood, Ladybrand, Orange River Colony.
Cocking, J. J., Prahran, Victoria.
Cook, G. E., Downing Street, King William's Town, South Africa (Year-Book to Evans Sons, Lescher & Webb, Ltd., 60, Bartholomew Close, E.C.).
Criper, W. R., F.I.C., Konnagur, near Calcutta.

Day, H. Bartlett, Northam, Western Australia (Year-Book to Evans Sons, Lescher & Webb, Ltd., 60, Bartholomew Close, E.C.).
Dey, Notendra Lall, 4, Beadon Street, Calcutta, India.

Edson, J., Medical Hall, Queen Street, Auckland, New Zealand (Year-Book to Evans Sons, Lescher & Webb, Ltd., 60, Bartholomew Close, E.C.).
Elgie, Simon Kelsey, 47, Gardiner Street, Durban, Natal.
Evans, Alfred B., 32, St. Gabriel Street, Montreal.

Flint, Charles Bruce, Mount Gambier, South Australia.
Forrest, J. K., Jeffcott Street, West Melbourne, Victoria.
Fothergill, J., 10, Rue Keppler, Champs Elysées, Paris.
Fritzsche, Karl, care of Messrs. Schimmel & Co., Miltitz, near Leipzic, Saxony.

Garibaldi, J. A., 21, Church Place, Gibraltar.
Garner, W. W , Perth, S.A. (care of F. H. Faulding & Co., 54, Great Tower St., E.C.)
Gasson, W., Kimberley, South Africa (Year-Book to Maw, Son & Sons, 11, Aldersgate Street E.C.).
Gibb, Andrew, care of Bathgate & Co., 19, Old Court House Street, Calcutta.
Glover, Henry, Mount Gambier, S. Australia.
Gordon, J. C., 662, Main Street, Winnipeg, Manitoba, Canada.
Grice, Walter T., F.C.S., Messrs. Smith, Stanistreet & Co., Calcutta.
Grimwade, E. Norton, 342, Little Flinders Street, Melbourne (care of Grimwade, Ridley & Co., Muscovy House, Trinity Square, London, E.C.).

Harrison, J. B., M.A., F.I.C., Government Analyst, Georgetown, British Guiana.
Holmes, F., Charles and Brisbane Streets, Launceston, Tasmania.
Hooper, D., F.I.C., F.C.S., Indian Museum, Calcutta.
Hooper, E. G., Church Street, Hawthorn, Victoria.
Hotop, Lewis, Queenstown, Otago, N.Z.
Huggard, W. R., M.A., M.D., F.R.C.P., British Vice-Consul, Davos Platz, Switzerland.
Hughes, A. E., Elizabeth Street, N. Melbourne.
Huntsman, T., 250, Nicholson Street, Fitzroy, Victoria.

Ingram, Fred, 73, Smit Street, Johannesburg (Year-Book to Maw, Son & Sons, 11, Aldersgate Street, E.C.).

Jones, J. W., care of Smith, Stanistreet & Co., 9, Dalhousie Square, Calcutta.

Leslie, R. A. P., care of Smith, Stanistreet & Co., 9, Dalhousie Square, Calcutta.
Ley, D., East Maitland, New South Wales (Year-Book to Evans Sons, Lescher & Webb, Ltd., 60, Bartholomew Close, E.C.).
London, H., Warrnambool, Victoria.

Macfarlane, Thos., Inland Revenue Dept., Ottawa, Canada.
MacGregor, James, 17, Old Court House Street, Calcutta.
McGuffie, W. A., 146, Queen Street, Brisbane (Year-Book to Maw, Son & Sons, 11, Aldersgate Street, E.C.).
McJannet & Co., East London, Cape Colony.
Mager, W. K., Queenstown, Cape Colony.
Mather, Enoch, LL.D, F.R.M.S., 80, Park Place E., Detroit, Michigan, U.S.A.
Meiring, J., Worcester, Cape Colony, S. Africa (Year-Book to Evans Sons, Lescher & Webb, Ltd., 60, Bartholomew Close, E.C.).
Mewkill, Henry Jas., St. Arnaud, Victoria.
Miller, C. B., Graaf Reinet, Cape Colony (Year-Book to Lennon, Ltd., 53, Queen Elizabeth Street, S.E.).
Moore, William, F.I.C., Dibrugarh, Upper Assam, India.
Murray, Leonard E., Colonial Dispensary, Port of Spain, Trinidad, W.I.
Murdock, J. W., 271, Dalhousie Street, Rangoon.

Napper, E. H., care of Smith, Stanistreet, & Co., 9, Dalhousie Square, Calcutta.

Ogburn, J., Charlton, Victoria.
Owen, J. H., Wellington (Year-Book to Sharland & Co., 43, London Wall, E.C.).

Paddock, M. V., St. John, New Brunswick.
Parr, W. J., 1, Hunter's Road, Vepery, Madras.
Pincus, Max, Castlemaine, Victoria.
Plowman, Sidney, F.R.C.S., F.I.C., etc., The Tofts, Frankston, Victoria.
Pond, J. A., Auckland, N.Z.
Poynter, Robt. S., Coleraine, Victoria.

Quipp, Joseph E. H., 95, Windsor Street, Montreal (Year-Book to Horner & Sons, Mitre Square, E.C., care of Lyman, Sons & Co.).

Rainer, C. O., Water Street, George Town, Demerara (Year-Book to S. Maw, Son & Sons, 11, Aldersgate Street, E.C.).
Reaveley, R., Konnagur, Calcutta.
Rich, Stiles W. G., care of Thomason, Chater, Ltd., Brisbane, Queensland.
Richmond, D. S., care of Smith, Stanistreet, & Co., 9, Dalhousie Square, Calcutta.
Row, W. Edward, George Street North, Sydney, New South Wales (Year-Book and Letters care of Saddington & Co., 30, Lime Street, E.C.).
Ruttonjee, H., 27, Mody Khana Street, Fort, Bombay.

Samuel, J. B., Mussoorie, India (Year-Book and Letters care of A. Lawrie & Co., 14, St. Mary Axe, E.C.).
Say, S. V. B., Benalla, Victoria.
Scammell, L. R., Adelaide (care of F. H. Faulding & Co., 54, Great Tower Street, E.C.).
Schaer, Prof. Ed., M.D., Pharmaceutisches Institut, Universität, Strassburg.
Shillinglaw, H., Swanston Street, Melbourne, Victoria.
Smale, F. T., Allahabad, India.
Smith, H. A. J., Smith & Sons, Ootacamund, India.
Smith, J. D., Smith & Sons, Ootacamund, India.

Smith, W. E., J.P., High Court, Madras, India.
Smith, W. Fraser, care of W. E. Smith & Co., Mount Road, Madras, India.
Speechly, E., Kurachi, Scinde, India (Year-Book to Maw, Son & Sons, 11, Aldersgate Street, E.C.).
Spurge, E. C., 619, Buffalo Avenue, Niagara Falls, U.S A.
Squire, F. R., San Remo, Italy.
Stoddart, A. L., 449, Burwood Road, Hawthorn, Victoria.
Swinton, Ralph S., c/o W. J. Bush & Co., Linden, New Jersey, U.S.A.
Symes, C. F., 298, Bourke Street, Melbourne (Year-Book, etc., to Symes & Co., 14, Hardman Street, Liverpool).

Taitt, A. J., Colonial Dispensary, Frederick Street, Port of Spain, Trinidad.
Tanner, J. B. H., Nathalia, Victoria
Thomas, H., Croydon, Queensland.
Thomas, H. W., care of Smith, Stanistreet & Co., 9, Dalhousie Square, Calcutta.
Thomas, Lewis, Box 68, Johannesburg (Year-Book to Symes & Co., 14, Hardman Street, Liverpool).
Timmins, W. P., 51, Glebe Road, Sydney, N.S.W. (Year-Book to Grimwade, Ridley & Co., Muscovy House, Trinity Square, E.C.)
Towl, Chas. E., care of Chas. Ogg & Co., 76, Collins Street, Melbourne, Victoria.
Tremble, J. E., Corner of Mountain and St. Catherine Street, Montreal (Year-Book to Horner & Sons, Mitre Square, E.C., care of Lyman, Sons & Co., Montreal).

Varley, F., Wynberg, Cape Colony (Year-Book to Maw, Son & Sons, 11, Aldersgate Street, E.C.).

Walker, Geo., The Dispensary, Penang (Year-Book to Evans Sons, Lescher & Webb, Ltd., 60, Bartholomew Close, E.C.).
Walsh, A., Adderley Street, Cape Town. (Year-Book and Letters to Lennon, Ltd., 53, Queen Elizabeth Street, S.E.).
Watkins George, 206, Queen Street, Brisbane, Queensland.
Wetzel, H. A., Detroit, Michigan, United States (care of Parke, Davis & Co., 111, Queen Victoria Street, E.C.).
Wheeler, F., Grant Street, Alexandra, Victoria.
Wilkinson, R., Dunedin, New Zealand.
Willet, J. A., Port Elizabeth, Cape Colony.
Woolcott, J. N., Warracknabeal, Victoria.

HOME MEMBERS.

Abraham, Alfred C., F.I.C., F.C.S., 87, Bold Street, Liverpool.
Abraham, T. F., 87, Bold Street, Liverpool.
Adams, F., 20, High Street, Stoke-on-Trent.
Aitken, R., 73, Princes Street, Edinburgh.
Alcock, F. H., F.I.C., F.C.S., 9, Broad Street Corner, Birmingham.
Alexander, J., 101, South Road, Waterloo, Liverpool.
Alexander, W. G., 14, Portland Place, Leith, N.B.
Allen, B., 125, Hampton Road, Redland, Bristol.

Allen, C. B., 20, High Road, Kilburn, N.W.
Allen, Edward R., 7, Cowper Street, Finsbury, E.C.
Allen, K. C., 7, Cowper Street, Finsbury, E.C.
Allen, W. C., 7, Cowper Street, Finsbury, E.C.
Allen, W. N., 48, Henry Street, Dublin.
Anderson, John, 14, Strathmartine Road, Dundee.
Andrews, E. A., F.C.S., St. Mary's Hospital, Paddington, W.
Antcliffe, Herbert, Union Offices, Sheffield.
Arkinstall, W., Fernleigh, Market Drayton.
Arnfield, J. C., 7 & 9, Lower Hillgate, Stockport.
Arnold, H. R., 16, Coleman Street, E.C.
Arrowsmith, A. R., 3, Wontner Road, Balham, S.W.
Ashton, C. S., 46, Dyke Road, Brighton.
Ashton, F. W., 65, Lansdowne Road, Croydon.
Aston, W., 27, Montague Street, Worthing.
Atkins, S. R., J.P., The Mount, Elm Grove, Salisbury.
Atkins, W. R., Market Place, Salisbury.
Atkinson, J. G., 25, Westow Hill, Upper Norwood, S.E.
Atkinson, Leo, 285, Brockley Road, S.E.
Attfield, Prof. J., Ph.D., F.R.S., "Ashlands," Watford, Herts.
Austen, John, 20, Dover Road, Sheffield.

Bailey, J. H., Old Town Street, Plymouth.
Bain, John, 4, Quadrant, Lime Street, Liverpool.
Bain, John, Penzance House, Bridge of Allan, N.B.
Baker, Parson C., 174, Victoria Street, S.W.
Balcomb, J., 10, Suffolk Parade, Cheltenham.
Ball, A. W., 179, Queen Victoria Street, E.C.
Balmforth, A., Whalley Range, Manchester.
Bannister, W., Victoria Lodge, Cork.
Barfoot, W., Chesterfield.
Barge, John, Belgrave House, Mutley, Plymouth.
Barlow, Alfred H., Oak Avenue, Romilly, Stockport.
Barnes, J. B., F.C.S., 225, Knightsbridge, S.W.
Barrett, J. T., 30, Regent Street West, Leamington.
Barron, Wm., Cheltenham.
Bascombe, F., F.I.C., 17, St. Saviour's Road, Brixton Hill, S.W.
Basker, J. A., F.C.S., 17, Fore Street, Bridgwater.
Batchelor, A. E., 15, West Street, Fareham, Hants.
Bates, J., Arran Lodge, Holly Walk, Leamington.
Bateson, Thos., J.P., Bank House, Kendal.
Batting, T. Gilbert, 16, Calverley Road, Tunbridge Wells.
Baxter, John, Ballymoney.
Baxter, W. J., J.P., M.C.P.S.I., Church Street, Coleraine.
Bayley, G. H., Upper Nab House, Shipley, near Leeds.
Bayne, Thomas, 21, Duke St., Edinburgh.
Beach, W. B., 9, East Street, Bridport.
Beacock, H., Upperhead Row, Leeds.
Beggs, G. D., The Dalkey Medical Hall, Dalkey, Co. Dublin.
Bell, C. B., 6, Spring Bank, Hull.
Bell, E. Wightman, F.C.S., County Agricultural Laboratory, Spalding.
Bell, Peter, 60, Elswick Road, Newcastle-on-Tyne.
Bell, W. M., 2, Malvern Road, Kilburn, N.W.
Bellamy, Dr. J. H., Firvale Infirmary, Sheffield.
Bennett, F. B., 87, King St., Whitehaven.
Bennett, Fred. W. Moncrieff, 238, High Street, Arbroath, N.B.
Bennett, Reginald R., 7, Maze Road, Kew, S.W.
Bernard, J. I., 26, Clare Street, Dublin.
Berry, W., F.C.S., F.I.Inst., General Hospital, Bristol.

Betty, R. B., 1, Park Street, Gloucester Gate, Regent's Park, N.W.
Bevan, E. J., F.I.C., 4, New Court, Lincoln's Inn, W.C.
Billington, F., 201, Edge Lane, Liverpool.
Bilson, F. E., 1, Lansdown Crescent, Bournemouth.
Bird, F. C. J., 15, Laurence Pountney Lane, E.C.
Birkbeck, J. T., 5, Bailgate, Lincoln.
Black, H. Milner, 81, St. James Street, Brighton.
Blain, W., 25, Market Street, Bolton.
Blamey, C. A., 77, King's Road, Brighton.
Blake, C. A., 49, Dover Street, W.
Blake, R. F., F.I.C., F.C.S., Queen's College, Belfast.
Boa, Peter, 119, George Street, Edinburgh.
Boardman, F. J., 19, Market Street, Leigh, Lancs.
Bolton, C. A., 40, Carlton Street, Nottingham.
Bond, Cyrus H. B., 24, West Heath Road, Chiswell Road, Dudley Road, Birmingham.
Boorne, H. E., 49, Woodstock Road, Redland Green, Bristol.
Booth, S. V., 25, Grosvenor Road, Tunbridge Wells.
Bostock, John, 84, High Street, West Cowes, I. W.
Bostock, J. W., Burlington Street Mills, Ashton-under-Lyne.
Bottle, A., F.C.S., 4, Godwyne Road, Dover.
Bourdas, I., 48, Belgrave Road, S.W.
Bourdas, Isaiah, junr., 6, Pont Street, Belgrave Square, S.W.
Boutall, G. S., 52, Marchmont Street, W.C.
Bowen, J. W., 13, Curzon Street, W.
Bowles, Bertram H., F.C.S., Cropstone, Dunsmore Road, Stamford Hill, N.
Bowman, W. Powell, 7, White Horse Street, Leeds.
Boyd, Alex., 453, Shields Road, Pollokshields, Glasgow.
Boyd, S. P., J.P., M.A. (T.C.D.), Dromana, Leeson Park, Dublin.
Braby, F., F.C.S., F.G.S., M.R.I., Bushey Lodge, Upper Teddington, Middlesex.
Bradley, C., 46, Market Place, Reading.
Bradley, S. W., 141, Mornington Road, Leytonstone, E.
Braithwaite, J. O., Hilika, Warren Road, Chingford, Essex
Branson, F. W., F.I.C., F.C.S., 14, Commercial Street, Leeds.
Brazier, W. N., Brook Street, Stourbridge.
Breadner, C. G., Cheetham, Manchester.
Breeze, G., J.P., 10, College View, Ford Park, Plymouth.
Bremridge, R., 17, Bloomsbury Square, W.C.
Brewis, E. T., F.I.C., 21, Belgrave Road, Leyton, Essex.
Bridge, G. E., 128, Old Christchurch Road, Bournemouth.
Bright, R., 29, Broad Bridge Street, Peterborough.
Brodie, R., 253, Crown Street, Glasgow.
Brooks, J., 42, Shudehill, Manchester.
Brown, D. Rainy, 9 & 11, Moor Lane, Fore Street, E.C.
Brown, David, F.R.S.E., 93, Abbey Hill, Edinburgh.
Brown, George, 20, Wexford Street, Dublin.
Brown, J., "Glencoe," 20, Tower Road, Dartford, Kent.
Browne, H. C., 1, Cornfield Road, Eastbourne.
Brunker, J. E., M.A., F.C.S., 18, Grosvenor Place, Rathmines, Dublin.
Brunt, G. H., 323, Coventry Road, Birmingham.
Buchanan, D., Kirriemuir, N.B.
Buchanan, J., 6, North Bridge, Edinburgh.
Buck, Anthony S., 179, Bedford Street, Liverpool.
Bush, Alfred W., Ash Grove Works, Hackney, E.
Buckett, A. H., 22, Market Place, Penzance.
Buckle, J., 20, Market Place, Malton, Yorks.

Burford, S. F., F.C.S., Halford Street, Leicester.
Burkey, J. C., 3, Fitz-William Avenue, Ballynafeigh, Belfast.
Burnell, Jno. S., 319, Glossop Road, Sheffield.
Burnett, Jos. F., F.C.S., 8, River View, Ashton, Preston
Bush, J. E., Melksham.
Butler, E. H., New Haymarket, Leicester.
Butterworth, A., 37, Wakefield Road, Bradford, Yorks
Buxton, T., 82, Queen's Road, Clifton, Bristol.

Campkin, B. S., Mill Road, Cambridge.
Candy, Hugh, B.A., B.Sc. (Lond.), F.I.C., The College, London Hospital, E.
Care, H. Bristowe, 25, Esplanade Terrace, Portobello, Edinburgh.
Carmichael, M., 1103, Pollokshaws Road, Crossmyloof, Glasgow.
Carr, Percy, 85–87, Ecclesall Road, Sheffield.
Cart, John Trevor, 25, Mayflower Road, Clapham, S.W.
Carteighe, M , F.I.C., F.C.S., 180, New Bond Street, W.
Carter, W., 2, Union Terrace, Cheetham Hill, Manchester.
Catford, J. P., 6, Sandon Terrace, Upper Duke Street, Liverpool.
Cave, J. R., 52, Nevill Street, Southport.
Chalmers, W., 24, Bramshill Road, Harlesden, N.W.
Chamberlain, A. G., F.C.S., 3, Market Place, Rugby.
Chaplin, J. L., 60, Westgate, Wakefield, Yorks.
Chapman, Alfd.. C., F.I.C., F.C S., 8, Duke Street, Aldgate, E.C.
Chapman, H., 52, Newborough, Scarborough.
Chase, T., 151, Broad Street, Birmingham.
Chaston, A E., 45, High Street, Winchester.
Chater, E. M., 129, High Street, Watford.
Cheney, Henry R., The Crescent, Dursley, Glos
Cholerton, Alf. F., 40½, Belgrave Gate, Leicester.
Church, E. H., 18, St. Andrew's Street, Cambridge.
Church, Prof. A. H., M.A., D.Sc., F.R.S., F.S.A., Shelsley, Kew Gardens, Surrey.
Clague, Thos. Maltby, 11, Grey Street, Newcastle-on-Tyne.
Clare, Jno., 1, Harcourt Place, Scarborough.
Clark, W. Inglis, D.Sc., 104, 106 & 108, South Canongate, Edinburgh.
Clark, J., 137A, Pilgrim Street, Newcastle on-Tyne.
Clark, J. A., 57, Weston Park, Crouch End, N.
Clark, J. W., " Houghton House," Victoria Road, Leicester.
Clark, Richard, D.L., J.P., 17, Smith's Place, Leith Walk, Edinburgh.
Clarke, C. Goddard, J.P., L.C.C., 60 to 64, Artillery Lane, E.
Clarke, F., 101, Whitecross Street, E.C.
Clarke, J., 38, George Street, Croydon.
Clarke, R. Feaver, 21, High Street, Gravesend.
Clarke, W. J., 40, Wilkinson Street, Albert Square, Clapham Road, S.W.
Clarke, W. J., 153B, High Street, Stockton-on-Tees.
Clayton, F. C., 18, St. James' Road, Birmingham.
Clinton, Bridget Rose, 19, North Earl Street, Dublin.
Close, T., 45, Corporation Road, Middlesboro'.
Coats, J. T., " Gowanburn," Trinity Road, Edinburgh.
Cockburn, B., Orrock Manse, Hawick, N.B.
Cockburn, C. T., 130, Howard Street, Glasgow.
Cofman, Joseph, 41, Hart Street, New Oxford Street, W.C.
Colchester, W. M., 53, Coronet Street, Hoxton, N.
Coleman, A., 55, Commercial Road, Newport, Mon.
Coley, S. J., 57, High Street, Stroud, Gloucestershire.
Collen, Creswell, 78, St. John's Road, Clapham, S.W.
Collins, H. G., care of Mr. Hemingway, Hampstead, N.W.
Collis, A. F., 11, Abbey Churchyard, Bath.

Connor, J. E., Ph. Ch., M.C.P.S., of Ireland, 79, Hill Street, Newry.
Conyngham, Hy., 32, Upper Baggot Street, Dublin.
Cooley, W. B., F.C.S., 5, Dudley Street, Wolverhampton.
Cooper, A., F.C.S., 80, Gloucester Road, South Kensington, S.W.
Cooper, A. J. Bullen, Grimston Lawn, Ealing.
Cooper, J., 4, Boulevard, Weston-super-Mare.
Cooper, W. M., 110, South View Road, Sharrow, Sheffield.
Cope, John A., 3 Market Place, Derby.
Corder, Octavius, 31, London Street, Norwich.
Cornwell, T. C., 14, Piccadilly, Hanley, Staffs.
Cortis, A. B., F.C.S., 30, South Street, Worthing.
Costerton, H. A., 140a, Western Road, Brighton.
Coull, Dr. George, 23, Cambridge Gardens, Leith, Edinburgh.
Coupland, H. S., 101, Whitecross Street, E.C.
Cowie, William Beaverly, Principal, Edinburgh Central School of Pharmacy, 26, Clyde Street, Edinburgh.
Cowley, R. C., 6, Sandon Terrace, Upper Duke Street, Liverpool.
Crawshaw, E., F.R.G.S., F.R.M.S., 80, Fann St., Aldersgate St., E.C.
Cripps, R. A., F.I.C., The Laboratory, d'Avigdor Road, Hove, Sussex.
Cross, W. Gowen, J.P., 70, Mardol, Shrewsbury.
Crossley, Prof. A. W., D.Sc., Ph.D., 17, Bloomsbury Square, W.C.
Crouch, W. S., 283, Fulwood Road, Sheffield.
Crowden, S. G., 120, Marchmont Road, Edinburgh.
Cummings, Wm., 49, Reform Street, Dundee.
Currie, Archibald, 162, Ferry Road, Leith.
Currie, W. L., 223, Byres Road, Glasgow.
Curry, Frank, Snow Hill Buildings, E.C.
Curtis, M., 51, High Holborn, W.C.
Cuthbert, R., 12, Westgate, Huddersfield
Cuxson, J. (Cuxson, Gerrard & Co.), Corporation Street, Birmingham.

Dales. E., c/o Messrs. Munro & Co., 273, Regent Street, W.
Darling, W. H., F.I.C., F.C.S., 26, Dover Street, Oxford Road, Manchester, S.E.
Darroll, W., Clun, Salop.
Davenport, H., 117, Union Street, S.E.
Davidson, A., 172, High Street, Montrose, N.B.
Davidson, P., 342, High Road, Brondesbury, N.W.
Davies, Griffith, 382, Fulwood Road, Sheffield.
Davies, J., 75, Oxford Street, Swansea.
Davies, J. T., 13, Walter Road, Swansea.
Davies, W. J., 101, Church Street, Brighton.
Davis, E., 29, Commercial Street, Newport, Mon.
Davis, R. Hayton, F.C.S., 23, Regent Parade, Harrogate.
Deane, H., 34, Drakefield Road, Upper Tooting, S.W.
Deverell, Louis C., F.C.S., 104, Upper Thames Street, E.C.
Dickson, J. Scott, 1, St. Paul's Terrace, Newcastle-on-Tyne.
Dixon, Rowland, Hunter's Bar, Sheffield.
Dixon, W. E., M.D., M.A., Pharmacological Laboratory, Cambridge.
Dobbin, Leonard, Ph.D., Chemistry Department, The University, Edinburgh.
Dobinson, T., 125, Newgate Street, Bishop Auckland.
Dodd, W. Ralph, F.C.S., " Frederwen," Village Road, Enfield, N.
Doig. John L., 9, High Street, Dundee.
Doig, William, 9, High Street, Dundee.
Dolbear, John, 108, High Street, Oxford.
Donald, James J., 29, George Street, Perth.

Dott, D. B., F.R.S.E., F.I.C., 93, Abbeyhill, Edinburgh.
Douglas, Robt. D., 283, Fulwood Road, Sheffield.
Drayton, Ernest, William Street, Herne Bay.
Druce, G. Claridge, M.A., F.L.S., 118, High Street, Oxford.
Drysdale, J. W., 16, Creechurch Lane, E.C.
Dudderidge, F. R., F.C.S., 55, Northumberland St., Newcastle-on-Tyne.
Duncan, S., 19, West Blackhall Street, Greenock, N.B.
Duncan, W., F.C.S , Royal Dispensary, 21, West Richmond Street, Edinburgh.
Dunlop, T., Albert Cross, Pollokshields, Glasgow.
Dunlop, T. W., 20, Beulah Hill, Norwood, S.E.
Dunn, H., 31, Otley Road, Shipley, Leeds.
Durrant, G. R., 1, Old Cross, Hertford.
Dutton, H. O., Rock Ferry, Birkenhead.
Dyson, T. H., 6, Giltspur Street, E.C.

Eardley, J. F., 265, Glossop Road, Sheffield.
Edwards, Fred. W., 64, Coppice Side, Swadlincote.
Elborne, W., M.A., F.L.S., F.C.S., School of Science and Art, Peterborough.
Ellinor, G., The Pharmacy, 127, Spital Hill, Sheffield.
Elliot, W. M. Bingham, Coldstream, N.B.
Ellis, C. S., 144, Edmund St., Birmingham.
Ellis, Fredk. R., F.C.S., 15, Shadwell Road, Bishopston, Bristol.
English, Thomas J., 17, Rathgar Road, Dublin.
Esam, Richard, The Infirmary, Leicester.
Escritt, H. T., 102, High Road, Streatham, S.W.
Evans, C., 49, Dawson Street, Dublin.
Evans, E., 56, Hanover Street, Liverpool.
Evans, E. J., North Parade, Aberystwith.
Evans, J. H., Medical Hall, Market Cross, Lymm.
Evans, J. H., 56, Hanover Street, Liverpool.
Evans, J. J., 56, Hanover Street, Liverpool.
Evans, J. N. E., 56, Hanover Street, Liverpool.
Evans, John, A.I.C., City Analyst's Laboratory, Sheffield.
Evans, Kenneth W., 56, Hanover Street, Liverpool.
Evans, W. P., 56, Hanover Street, Liverpool.
Everett, J. G., 29, High Street, Windsor.
Ewell, R. M , 37, Town Wall Street, Dover.
Ewing, Jas. Laidlaw, J.P., 104, South Canongate, Edinburgh.
Exley, J., 34, Hunslet Lane, Leeds.

Fairclough, R. A., c/o Messrs. Lennon, Ltd., 54 to 58, Queen Elizabeth Street, S.E.
Fairley, T., F.R.S.E., F.I.C., F.C.S., 17, East Parade, Leeds.
Fairweather, E. B., F.C S., King's College Hospital, W.C.
Farr, E. H., F.C.S., The Laboratory, Uckfield, Sussex.
Farries, Thos., F.I.C., F.C.S., 16, Coleman Street, E.C.
Fell, J. C., F.C.S., Lansdowne Cottage, Ryde, I.W.
Ferguson, John, 7, Scott Street, Perth.
Ferrall, A. T., 67, Lower Mount Street, Dublin.
Ferrier, D. H., 2, Hilltown, Dundee.
Fielding, P. J. D., F.C.S., F.S.M.C., 66, Patrick Street, Cork.
Finlay, J., The Pharmacy, Kilrush, Co. Clare.
Finnemore, H., Guy's Hospital, S.E.
Fisk, F. M., 111, Queen Victoria Street, E.C.
Fitt, F. E., 5, Peckham Rye, S.E.
Fitzgerald, A. H., Corner of Birkbeck Road, Muswell Hill, N.

Fitz Hugh, R., J.P., The Park, Nottingham.
Fletcher, F. W., F.C.S., Beauchamp Lodge, Enfield, Middlesex.
Foggan, George, Leadgate House, Bedlington, Northumberland.
Forbes, James, 6, Ocklynge Parade, Eastbourne.
Forbes, John J., 9, Broad Street, Denny, N.B.
Ford, J., High Street, Kirriemuir, N.B.
Ford, Jessie, Clifton, Kirriemuir, N.B.
Forret, J. A., 26, Brougham Place, Edinburgh.
Forshaw, Chas. F., LL.D., D.D.S., F.R.S.L., F.R.H.S., F R.C.I., F.C.S. (Berlin), 48, Hanover Square, Bradford, Yorks.
Forster, G. F., 52, Castle Street, Dover.
Forster, Wm., 30, Church Street, Seaham Harbour.
Foster, John, 479, Sauchiehall Street, Glasgow.
Foster, Murray Toogood, Collumpton, Devon.
Foster, Reginald Le Neve, J.P., F.C.S , Bollindene, Wilmslow, Cheshire.
Fox, A. Russell, F.L.S., 8, Castle Street, Sheffield.
Fox, C. E., 109, Bethnal Green Road, E.
Francis, Alan, 38 and 40, Southwark Street, S.E.
Francis, Geo. Bult, F.C S., 38 & 40, Southwark Street, S.E.
Francis, Wm. Hy., "Cleveland," Thornton Road, Clapham Park, S.W.
Franklin, A. J., 86, King's Road, Brighton.
Franklin, J. H., 374, Bury New Road, Manchester.
Fraser, Alexr., 100, High Street, Paisley, N.B.
Fraser, J. Innes, 9, Dundas Street, Edinburgh.
Freeman, E., 6, Market Place, Ledbury, Herefordshire.
Freeman, Thomas, 57, Mansfield Road, Nottingham.
Fudgé, C. W., Shepton Mallet.

Gadd, H., J P., 97, Fore Street, Exeter.
Gadd, H. Wippell, F.C.S., 97, Fore Street, Exeter.
Gadd, Sydney Chas., 97, Fore Street, Exeter.
Galloway, P. H., 8, Baden Place, Crosby Row, Long Lane, Borough, S.E.
Gamble, F. W., 7, Vere Street, W.
Garsed, Wm., 18, Victoria Road, Elland, Yorks.
Gerrard, A. W., F.C.S., 35, Queen's Road, Wimbledon, S.W.
Gibbs, R. Darton, 18, Charlotte Road, Edgbaston, Birmingham.
Gibbs, Sydney, 53D, Terminus Road, Eastbourne.
Gibson, F. J., 93, Darlington Street, Wolverhampton
Gibson, R., Erskine Street, Hulme, Manchester.
Gibson, S., Summerhill, Dunmerry, Co. Antrim.
Gibson, W. H., F.C.S., 122, King's Road, Brighton.
Gibson, Wm. Jas., Montpelier House, Malone Road, Belfast.
Gifford, R. Lord, Blackburn.
Gilderdale, F., F.C.S., c/o John Ismay & Sons, Newcastle-on-Tyne.
Giles, W., 123, Crown Street, Aberdeen.
Gill, Frank I., 16, Poolbeg Street, Dublin.
Gill, Wm. S., 193, Sumatra Road, West Hampstead, N.W.
Gilmour, J. P., 312, Cathcart Street, Glasgow.
Glass, Wm. Stephen, 193, Morningside Road, Edinburgh.
Glyn-Jones, W. S., Endsleigh, Palmer's Green, London, N.
Goldby, F., The Enfield Pharmacy, Enfield Town, N.
Goldfinch, G., F C.S , 7, Church Walk, Hendon, N.W.
Goldon, H. V., M.C.P.S.I., Birr.
Golds, Lewis G., 59, Church Road, Norwood, S.E.
Goldthorpe, Arthur, 70, Herbert Road, Plumstead, S.E.
Goodwin, F. A., 79, Mutley Plain, Plymouth.
Gostling, T. P., Linden House, Diss.

Gough, J. H., F.C.S., 65, Grange Avenue, Chapeltown Road, Leeds.
Gray, John, 128A, Nethergate, Dundee
Green, S., 60, Nunhead Lane, Nunhead, S.E.
Greenish, Prof. H. G., F.I.C., 17, Bloomsbury Square, W.C.
Greig, Wm., 59, Glassford Street, Glasgow.
Grier, Jas , Pharmaceutical Dept., The University, Manchester.
Griffiths, Dr. John S., 25, Redland Park, Redland, Bristol.
Griffiths, E. H., Market Street, Kidsgrove, Staffs.
Griffiths, W., 134, Market Place, Cirencester.
Grimes, H. C., Maryville, Carysfoot, Avenue, Blackrock, Dublin.
Grimwade, E. W., Muscovy House, Trinity Square, E.C.
Grose, N. M., 8, Temple Street, Swansea.
Groves, R. H., Blandford.
Guiler, J., 89, Ormeau Road, Belfast.
Gulliver, W. F., 6, Lower Belgrave Street, Pimlico, S.W.
Guy, Fredk., 12, North Street, Brighton.
Gwatkin, J. R., 49, Grand Parade, Brighton.

Haddock, Jas., Storth's Road, Barkby, Huddersfield.
Hall, Albert T., 22, Palmerston Road, Sparkbrook, Birmingham.
Hallaway, J., 5, Devonshire Street, Carlisle.
Hallawell, J , Florenceville, Vincent Road, Croydon.
Hamilton, Francis, Crieff, Perthshire.
Hallett, Wm. J., 10, Stall Street, Bath.
Hanbury, C., F.I.C., F.C.S., etc., Plough Court, Lombard Street, E.C.
Hanbury, F. Capel, Stainforth House, Upper Clapton, N.E.
Hanbury, F. J., F.L.S., Stainforth House, Upper Clapton, N.E.
Hanson, A., 3, High Street, Queensbury, Bradford, Yorks.
Hanson, A. W., High Street, Sidcup.
Hardie, J. M., 68, High Street, Dundee.
Hardwick, Stewart, 21, Commercial Road, Bournemouth.
Hargraves, H. L., 101, Queen's Road, Alexandra Park, Oldham.
Harland, R. H., F.I.C., F.C.S., 37, Lombard Street, E.C.
Harmer, G. A., 47, South Street, Eastbourne.
Harrington, J. F., 45, Kensington High Street, W.
Harrison, E. F., Langholm, Purley Oaks Road, S. Croydon.
Harrison, J., 33, Bridge Street, Sunderland.
Harrison, R. Casswell, Grayshott, Hants.
Harrison, W. B., 6, Bridge Street, Sunderland.
Hart, Frank (James Hart & Son), 130, Newport Street, Bolton.
Hartridge, J. Hills, Holmwood, Hendon, N.W.
Harvey, S., F.I.C., F.C.S., South Eastern Laboratory, Canterbury.
Hatch, R. M., L.D.S., R.C.S., D.D.S , Claremont House, Whiteladies' Road, Clifton, Bristol.
Havill, P. W., 27, Fore Street, Tiverton, Devon.
Hawkins, T., 56, Ludgate Hill, E.C.
Hayes, W., 12, Grafton Street, Dublin.
Hayhoe, W., 45, Cromwell Road, Pokesdown, Bournemouth.
Hayles, B. H., Holm Hurst, Hadley Road, New Barnet.
Heap, J. H., 7, Aylward Road, Forest Hill, S.E.
Hearder, H. P., 26, Westwell Street, Plymouth.
Hearle, J., 33, Liverpool Road, Islington, N.
Hearn, John, 38, Southwark Street, S.E.
Henderson, David Jas., Dundee Street, Carnoustie, N.B.
Henderson, H. J., King Street, Hitchin.
Hendry, R. L., 27, Earl Grey Street, Edinburgh.
Henley, Geo., Lyme Regis, Dorset.
Henry, Claude F., 1, Brandon Terrace, Edinburgh.

Henry, H. Lee, 19, High Street, Lewisham, S.E.
Heslop, Charles W. B., 36, The Gardens, East Dulwich, S.E.
Hewlett, John C., F.C.S., 35–42, Charlotte Street, Great Eastern Street, E.C.
Heywood, J. S. C., F.C.S., 19, Inverness Terrace, Hyde Park Gardens, W.
Hicks, W. T., 28, Duke Street, Cardiff.
Hill, C, A., 64, Park Street, S.E.
Hill, E. W., 160, Earl's Court Road, S.W.
Hill, J. Rutherford, 36, York Place, Edinburgh.
Hills, Walter, F.C.S., 225, Oxford Street, W.
Hirst, Benj., Millgarth Mills, Leeds.
Hitchman, H , Market Place, Kettering.
Hobbs, A. E., 33, Mount Pleasant, Tunbridge Wells.
Hobson, G. W., St. Ann's Pharmacy, The Colonnade, Buxton.
Hocken, J., 31, Old Hall Street, Liverpool.
Hodgeton, David, St. James' Park, Brechin.
Hodgkinson, C., 101, Whitecross Street, E.C.
Hogg, R., 1, Southwick Street, Hyde Park, W.
Holding, John, 169, Hemingford Road, Barnsbury, N.
Holliday, Jno., 18, High Street, Warwick.
Holmes, E. M., F.L.S., 17, Bloomsbury Square, W.C.
Holmes, W. M., Sutton, Surrey.
Holroyd, W. H., 31, Duke Street, St. James, S.W.
Hopkinson, W. J., 66, Southwark Bridge Road, S.E.
Hopley, John H., 6, Northgate Street, Chester.
Horsfield, F., Swanland House, Swanland Avenue, Bridlington.
Howard, D., F.I.C., F.C.S., Devon House, Buckhurst Hill, Essex.
Howard, D. Lloyd, F.C.S., City Mills, Stratford, E.
Howard, George, Ph.C., 81, Calverley Road, Tunbridge Wells.
Howard, W. D., F.I.C.. 11, Cornwall Terrace, Regent's Park, N.W.
Howden, F. Clair, Campdale Terrace, Tufnell Park, N.
Howell, M., Woodlands, County Grove, Camberwell, S.E.
Howie, W. L., F.R.S.E., Hanover Lodge, West Hill, Harrow-on-the-Hill.
Howlett, H. J., 40, Park Mansions, South Lambeth Road, S.W.
Hughes, J., 14, Wind Street, Swansea.
Hugill, J. H., 14 & 15, Miles Lane, Cannon Street, E.C.
Hugill, Thos. P., 118, Cannon Street, E.C.
Hull, John W., 47, Wentworth Road, Harborne, Birmingham.
Hume, John W. D., Grove Pharmacy, Lowestoft.
Humphrey, John, 17, Bloomsbury Square, W.C.
Humphreys, G., Central Pharmacy, High Street, Northwich.
Hunt, F. Wm., 106, Old Town Street, Plymouth.
Hunt, L., c/o Messrs. Goadsby & Co., 2, Albert Bridge, Manchester.
Hunter, G., Withernsea, Yorks.
Huskisson, H. O., F.I.C., F.C.S., F.L.S., Swinton Street, Gray's Inn Road, W.C.
Hutcheon, W., 21, High Street, Bonnyrigg, Midlothian.
Hutton, H., 42, Parade, Leamington.
Hyslop, J. C., 39, Church Street, Marylebone, N.W.

Idris, H. W., 120, Pratt St., Camden Town, N.W.
Idris, T. H. Williams, J.P., F.C.S., 120, Pratt St., Camden Town, N.W.
Idris, W. H. W., 120, Pratt St., Camden Town, N.W.
Idris, W. T. W., 120, Pratt Street, Camden Town, N.W.

Iliffe, G., 29, Market Place, Nuneaton.
Ince, J., F.L.S., F.C.S., F.G.S., "Glenholme," 13, Alfred Road, Acton, W.
Innes, David, 47, Melbourne Street, Stalybridge.

Jack, James, F.L.S., 102, High Street, Arbroath.
Jackson, A., 870, Rochdale Road, Manchester.
Jackson, G., 870, Rochdale Road, Manchester.
Jackson, H., 47, Comely Bank Place, Edinburgh.
Jackson, H., King's College, W.C.
Jackson, J., c/o Messrs. Harrison, Parkinson & Co., Sun Bridge Road, Bradford, Yorks.
Jackson, J. Gilbert, 338, Abbeydale Road, Sheffield.
Jackson, Joseph John, 6, Broad Street, Hereford.
Jacques, S. P., 2, Fenchurch Buildings, E.C.
James, H. P., 13, Briggate, Leeds.
Jeans, T. R., 1, Broad Street, Pendleton, Manchester.
Jennings, J. A., London Hospital, E.
John, William D., 104, Bute Docks, Cardiff.
Johnson, T., 8, Market Place, Wigan.
Johnston, Wm. Vincent, 9, Ranelagh, Dublin.
Johnstone, C. A., c/o Messrs. Woolley, Sons & Co., Victoria Bridge, Manchester.
Johnstone, Walter, Cromarty, N.B.
Jones, A. M., 42, King Street, Brynmawr, Breconshire.
Jones, Edwin, 108, Queen's Road, Bayswater, W.
Jones, E. W. T., F.I.C., F.C.S., Public Analyst, 10, Victoria Street, Wolverhampton.
Jones, Humphrey, Canoldre, Llangollen.
Jones, H. W., F.C.S., F.R.M.S., Spencer Park, Coventry.
Jones, R. H., 88, Norwood Road, S.E.
Jones, W., 2 & 3, High Street, Birmingham.
Jones, W. A., 51, North John Street, Liverpool.
Jones, W. Cadwalader, 4, Queen's Road, Bayswater, W.
Jowett, H. A. D., D.Sc., Wansfell, Church Avenue, Sidcup, Kent.

Kay, J. P., 205, Union Street, Aberdeen.
Kay, T., J.P., 45, St. Petersgate, Stockport.
Kelly, Albert E., 12, Cambridge Gardens, Edinburgh.
Kelly, Patrick, 16, South Richmond Street, Dublin.
Kemp, D. S., 52, Coverdale Road, Shepherd's Bush, W.
Kemp, H., Chorlton-cum-Hardy, Manchester.
Kemp, W. H., 34, Hanover Street, Liverpool.
Kennett, John Nash, Church Street, Weybridge.
Kent, B. J., Lindesmead, 32, Spilsby Road, Boston.
Kent, C., Phœnix Mills, Dartford, Kent.
Kerfoot, T., Bardsley Vale Mills, Ashton-u.-Lyne.
Kermath, W. R., Greyfriars Garden, St. Andrews, Fife.
Kerr, C., 56, Nethergate, Dundee.
Kerse, Wm., c/o John Ismay & Sons, City Road, Newcastle-on-Tyne.
Kidd, J. C., 551, Cheetham Hill Road, Manchester.
Kiloh, James, 103, Patrick Street, Cork.
Kinch, Prof. Ed., F.I.C., F.C.S., Royal Agricultural College, Cirencester.
Kirby, F. Benson, 128, Ashley Road, Bristol.
Kirby, Cyril H., 21, Lime Street, E.C.
Kirkby, W., F.L.S., F.R.M.S., Winster House, Thornfield Road, Heaton Moor, Stockport.

Knight, G. J., 452, Edgware Road, W.
Knight, W. T., 45, Westgate, Peterborough.
Knights, J. West, F.I.C., F.C.S., County Laboratory, 67, Tenison Road, Cambridge.
Knott, P., 1, Blackburn Road, Bolton.
Kühn, B., 16, Rood Lane, Eastcheap, E.C.

Lake, J. H., 41, High Street, Exeter.
Lambie, Hugh, 22, Nithsdale Road, Strathbungo, Glasgow.
Lancaster, B., 68, Holme Lane, Sheffield.
Lander, A., F.S.M.C., Medical Hall, Canterbury.
Lane, W., 8, Albert Road, Whalley Range, Manchester.
Latchmore, A., The Avenue, Hitchin.
Latreille, A., 48, Baker Street, Portman Square, W.
Law, T. W. T., 380, Hamilton Place, Partick, Glasgow.
Lawson, John, 256, Burley Road, Leeds.
Layman, Chas. N., 48 and 50, Southwark Street, London, S.E.
Layman, F. N., 48 & 50, Southwark Street, London, S.E.
Lee, S. Wright, 6, 8 & 10, Whitechapel, Liverpool.
Lee, W., Castle Northwich, Cheshire.
Leith, Peter, 43, Victoria Street, Rothesay, N.B.
Lenton, W. H., Long Metford.
Lescher, F. Harwood, F.C.S., 60, Bartholomew Close, E.C.
Lescher, T. E., 60 Bartholomew Close, E.C.
Lester, T. R., 107, Patrick Street, Cork.
Lewis, D. L., The Parade, Ealing, W.
Lewis, S. Judd, 122, Newington Causeway, S.E.
Liverseege, J. F., F.I.C., Council House, Birmingham.
Lloyd, J. W., 30, Mount Pleasant, Liverpool.
Lloyd, T. Howard, St. James Street, Humberston Road, Leicester.
Lockyer, W. J., F.C.S., 7, St. Julian's Road, West Norwood, S.E.
Long, F. C., 35, Otley Road, Headingley, nr. Leeds.
Longstaff, W. L., 811, Fulham Road, S.W.
Lorimer, J., Britannia Row, Islington, N.
Lothian, John, Principal, Glasgow School of Pharmacy, 180, West Regent Street, Glasgow.
Loxter, T. E., 60, Bartholomew Close, E.C.
Lucas, E. W., F.C.S., 225, Oxford Street, W.
Lucas, Harry, 1, St. Agnes Place, Kennington Park, S.E.
Lunan, G., 20, Queensferry Street, Edinburgh.

Maben, T., F.C.S., 63, Stradella Road, Herne Hill, S.E.
Macawra, Gerald Joseph, M.D., C.M., 4, Spring Bank, Bradford, Yorks.
Macdonald, A., 9, Moor Lane, Fore Street, E.C.
Macdonald, D Baird, F.C.S., c/o E. H. Butler & Son, Humberstone Gate, Leicester.
MacEwan, P., F.C.S., 64, Southwood Lane, Highgate, N.
Macfarlane, M., 19, East High Street, Forfar.
Macfarlane, T. B., 17, Main Street, Wishaw, N.B.
Macintyre, John, 34, High Street, North Berwick.
Mackay, G. D., Canning Street, Edinburgh.
Mackenzie, Donald, 54, Denton Road, Hornsey, London, N.
Mackenzie, J., 45, Forrest Road, Edinburgh.
Macpherson, Wm., 7, Fife Street, Dufftown, Banffshire, N.B.
McAdam, R., 32, Virginia Street, Glasgow.
McCorquodale, J. C., The Pharmacy, Markinch, Fife.

McDonald, Kenneth, Dunkeld.
McGregor, G., Ellon, Aberdeen, N.B.
McLaren, David, 42, South Clerk Street, Edinburgh.
McMillan, J., 17, Great Western Road, Glasgow.
McMurray, James, 37, West Clyde Street, Helensburgh.
McWalter, J. C., M.A., M.D., D.P.H., F.F.P.S. (Glas.), 19, North Earl Street, Dublin.
M'Naught, A., 4, West Blackhall Street, Greenock.
Mair, Wm., F.C.S., 7, Comiston Road, Edinburgh.
Maitland, F., 31, Chapel Street, Stonehouse, Devon.
Mander, A., F.C.S., Belle Vue Pharmacy, Malvern.
Mann, Ernest W., 17, Bull Street, Birmingham.
Mann, Sydney A., Pathological Laboratory, Claybury Asylum, Woodford Bridge, Essex.
Mansbridge, M. C., 373, High Street, Cheltenham.
Marchant, D., Star Road, Old Eastbourne.
Marris, T., 83, Bridge Street, Worksop, Notts.
Marsden, Prosper H., F.C.S., The University, Liverpool.
Martin, Harry, 14, Hardman Street, Liverpool.
Martin, N. H., J.P., F.R.S.E., F.L.S., F.C.S., Ravenswood, Low Fell, Gateshead-on-Tyne.
Martindale, W. H., Ph.D., 10, New Cavendish Street, W.
Mason, T., c/o Messrs. Newball & Mason, Nottingham.
Mather, J. H., Godalming.
Matthews, Harold E., 30, The Mall, Clifton, Bristol.
Matthews, H. R., 61, Charlotte St., Tottenham Court Road, W.
Matthews, T., Man of Ross House, Ross, Herefordshire.
Matthews, Wm., 67, Holborn Viaduct, E.C.
Maurice, J., 34, Bedford Street, Plymouth.
Mawer, W. F., F.C.S., 332, Kennington Road, S.E.
Mayger, W. D., 6, Regent Square, Northampton.
Meldrum, Martin, 150, High Street, Irvine.
Mellor, J. G., Market Place, Warwick.
Mellor, R. J., Hemel Hempstead.
Mercer, F. N., 101, Mostyn Street, Llandudno.
Merson, Geo. F., F.C.S., 7, King Street, Kilmarnock.
Metcalfe, C. L., 13, Whitefriargate, Hull.
Middleton, A., 25, Lister Gate, Nottingham.
Middleton, D., 85, Bruntsfield Place, Edinburgh.
Miles, C. J., 165, Edgware Road, W.
Millard, E. J., F.C.S., F.R.M.S., 35-42, Charlotte Street, E.C.
Miller, John, 4, Victoria Road, Brighton.
Mills, R. M., Bourne, Lincolnshire.
Milton, T. C., 265, High Street, Exeter.
Moffitt, T. N., 209, Crumlin Road, Belfast.
Moir, David, 4, Shawlands Cross, Shawlands, Glasgow.
Montgomery, Johnston, 147, Royal Avenue, Belfast.
Moor, C. G., M.A., F.I.C., Savoy House, Strand, W.C.
Moore, J. E. Langford, St. Bartholomew's Hospital, E.C.
Morgan, H. B., 31, Devonshire Road, Claughton, Birkenhead.
Morley, C., 3, Bucklersbury, E.C.
Morrison, Charles Orr, 137, West Street, Sheffield.
Morson, Albert, 14, Elm Street, Gray's Inn Road, W.C.
Morson, T. Pierre, 14, Elm Street, Gray's Inn Road, W.C.
Moylan-Jones, W. J., "Llanberis," Sunningfields Road, Hendon, N.W.
Murray, Richard, c/o Messrs. Brotherton & Co., Ltd., Holmes Street, Dewsbury Road, Leeds.
Muscott, R. W., "Amington," Acock's Green, Birmingham.
Muston, G. G., 57, Western Road, Brighton.

Muter, A. H. M., F.I.C., F.C.S., 325, Kennington Road, S.E.

Naylor, W. A. H., F.I.C., F.C.S., 38 & 40, Southwark Street, S.E.
Naysmith, A., 154, High Street, Arbroath.
Neale, J., 55, High Street, King's Lynn.
Neil, John, 557, Sauchiehall Street, Glasgow.
Nesbit, J., 162, High Street, Portobello, N.B.
Nesbit, James, 32, Wellington Street, Portobello, N.B.
Newcome, J., 71, High Street, Grantham.
Newsholme, G. T. W., F.C.S., 27, High St., Sheffield.
Newton, Alfd., Whalley Road, Accrington, Lancashire.
Nichol, A., 90, Botchergate, Carlisle.
Nicholl, I. W., M.P.S.I., 25, High Street, Belfast.
Nicholls, Wm. W. S., B.Sc., F.C.S., 230, Brockley Road, S.E.
Nidd, J. H., 714, Rochdale Road, Manchester.
Noble, J., 55, King Street, South Shields.
Norman, Valentine, High Street, Godalming.
Nuthall, E., Bank Plain, Norwich.

O'Connor, Hy., 54, Lower Sackville Street, Dublin.
Odling, Prof. W., M.B., F.R.S., etc., 15, Norham Gardens, Oxford.
Oldfield, Ashley C., 17, Todd Street, Manchester.
Otley, T., 82, Hagley Road, Birmingham.
Ough, Lewis, F.L.S., F.C.S., "Fernleigh," St. James' Rd., Leicester.
Oxen, D. H., 40, Bridge Street, Newcastle-under-Lyne.

Pack, F. J., 2, Whinbush Road, Hitchin.
Pain, Percy, 13, Sidney Street, Cambridge.
Pain, R., The Apollinaris Co., Ltd., 4, Stratford Place, Oxford Street, W.
Paine, Standen, The Firs, Devisdale, Bowdon, Cheshire.
Palmer, F. J., 12, Montpellier Avenue, Cheltenham.
Park, C. J., 23, Mutley Plain, Plymouth.
Park, F., 52, Collingwood Street, Newcastle-on-Tyne.
Parker, R. H., F.C.S., 35, Clifton Road, Maida Vale, W.
Parkes, G. J. R., Ferndale, 109, Musters Road, West Bridgford, Nottingham
Parkinson, F. W., Atherstone, Warwickshire.
Parkinson, R., Ph.D., F.I.C., Yewbarrow House, Grange-over-Sands.
Parry, E J., B.Sc., F.I.C., F.C.S., 208, Borough High Street, S.E.
Parsons, Wm., 54, Coper's Copse Road, Beckenham.
Partington, J J., 2, Beaufort West, Grosvenor, Bath.
Pater, J. B., Broomfield, Sheffield.
Paterson, James, Provost Jamieson's Quay, Aberdeen.
Patey, W. J., 76, New Bond Street, W.
Patterson, Alderman, D. J., West Hill House, Mansfield, Notts.
Payne, J. C. C., J.P., Albion Place, 134, Dublin Road, Belfast.
Peck, E. Saville, M.A., 30, Trumpington Street, Cambridge.
Peck, J. Wicliffe, Hospital for Sick Children, Gt. Ormond Street, W.C.
Peck, T. Whitmore, 270, Moseley Road, Birmingham.
Pedley, G., 17, Railway Approach, London Bridge, S.E.
Peebles, Thos. S., 103, High Street, Lochee, Dundee.
Perkins, J., 29, Victoria Street, Wolverhampton (Exors. of the late).
Perrédès, P. E. F., B.Sc., Wellcome Research Laboratories, 6, King Street, Snow Hill, E.C.
Perry, Sir Cooper, M.D., Superintendent's House, Guy's Hospital, S.E.
Perry, G. E., F.C.S., 171, Hagley Road, Birmingham.

Pettinger, E., 30, Rosslyn Hill, Hampstead, N.W.
Phillips, A. J., 156, Cromwell Road, South Kensington, S.W.
Phillips, H. S., 48, Wallgate, Wigan.
Phillips, J., 48, Wallgate, Wigan.
Phillips, Sidney, 8, Lichfield Street, Wolverhampton.
Philp, W. J. Ignatius, 34, High Street, Notting Hill.
Pidd, A. J., Brookfield, Upper Chorlton Road, Manchester.
Pitman, J., 42, Redcliff Hill, Bristol.
Pitt, Arthur E., F.C.S., 66, Abbott Road, Bromley, London, E.
Pitt, Chas. Day, 101, Church Street, Brighton.
Plumley, J. G., Bristol Bridge, Bristol.
Pollard, Evelyn Wm., B.Sc., Lond., 168, High Street, Ryde, I.W.
Pollard, Henry H., 168, High Street, Ryde, I.W.
Poole, James, 47, High Street, Newcastle, Staffs.
Poole, Jeffrey, 13, Great Hampton Street, Birmingham.
Potter, H., F.S.S., 62 & 64, Artillery Lane, E.
Power, Dr. F. B., 6, King Street, Snow Hill, E.C.
Prebble, J. G. (Messrs. Wing, Aplin & Co.), Chislehurst.
Presley, E., 12, St. Augustine's Parade, Bristol.
Preston, Job, 105, Barker's Pool, Sheffield.
Preston, J. C., 81, Bishopsgate Street Without, E.C.
Preston, T. I., Roundhay, Leeds.
Price, W., 30, Grove Road, Eastbourne.
Probyn, Lt.-Col. Clifford, 55, Grosvenor Street, Grosvenor Square, W.
Purse, Alfred D., 15 and 16, Salem Street, Sunderland.

Quant, Ernest, 2, Park Crescent, Torquay.
Quarrell, Wm. Henry, 3, East India Avenue, E.C.

Radcliffe, L. G., F.C.S., 6, Alma Terrace, Old Trafford, Manchester.
Ranken, C., F.C.S., F.R.M.S., 11, Stockton Road, Sunderland.
Rankin, W. J., 27, Newington Street, Belfast.
Ransom, F., F.C.S., The Chilterns, Hitchin.
Ransom, W., F.L.S., F.S.A., Fairfield, Hitchin.
Redford, G. A., 30, Oxford Street, Liverpool.
Rees, R. P., M.R.P.S., 177, High Street, Dowlais.
Remington, J. S., F.C.S., The Laboratory, "Aynsome," Grange-over-Sands.
Reynolds, Fred, 13, Briggate, Leeds.
Reynolds, R. J., 38 & 40, Southwark Street, S.E.
Richards, P. A. E., F.I.C., F.C.S., Charing Cross Hospital, W.C.
Richardson, H. N. B., B.A., F.C.S., c/o Messrs. John Richardson & Co., 10, Friar Lane, Leicester.
Richardson, R. T., 129, Ullet Road, Liverpool.
Rideal, S., D.Sc., F.I.C., F.C.S., F.G.S., 28, Victoria Street, Westminster, S.W.
Riding, John, 69, Market Street, Manchester.
Righton, J., 293, Lord Street, Southport.
Ringer, F. A., 23, St. Ann's Square, Manchester.
Roberts, R., 13, Church Street, Camberwell, S.E.
Roberts, S., 9 & 11, Clerkenwell Road, E.C.
Robertson, Dr. A. M., 27, Main Street, Anderston, Glasgow.
Robertson, D. S., 170, Main Street, Rutherglen, N.B.; and 70, Caledonia Road, Glasgow.
Robertson, George, Partick, Glasgow.
Robertson, John, 19, West Port, Arbroath, N.B.
Robertson, Dr. J. McGregor, M.A., M.B., etc., 26, Buckingham Terrace, Great Western Road, Glasgow.
Robinson, C. E., 4, Victoria Terrace, Hove.
Robinson, J., Front St., Stanley, R.S.O., Durham.

Robinson, R. A., J.P., 195, Brompton Road, S.W.
Robinson, R. A., junr., 17, Bloomsbury Square, W.
Robinson, Sir T. W., J.P., 112, Upper George's Street, Kingstown, Dublin.
Robinson, W., 33, Main Street, Cockermouth.
Robinson, W. P., 17, Pavement, Clapham Common, S.W.
Rodman, J. and R., 285, Duke Street, Glasgow.
Rodwell, Henry, St. Thomas' Hospital, S.E.
Rogers, Frank A., 327, Oxford Street, W.
Rogerson, W. J., 38 & 40, Southwark Street, S.E.
Rose, J. D., 18, Ormonde Street, Jarrow-on-Tyne.
Ross, Andrew L., 21, High Street, Montrose.
Rossiter, F., 9, Grand Parade, St. Leonards-on-Sea.
Rowland, George Howard Charles, 117, Prince's Street, Edinburgh.
Russell, James (of D. Russell & Son), 111, Nethergate, Dundee.

Sage, C. E., F.C.S., 2, Charterhouse Street, E.C.
Sainsbury, S., 136, Regent Street, W.
Sangster, A., 141, Finchley Road, South Hampstead, N.W.
Sargeant, F. Pilkington, F.C.S., Leeds College of Pharmacy, Leeds.
Saul, J. E., F I C., 63, Gondar Gardens, West Hampstead, N.W.
Saunders, W. H., 34, Hanover Street, Liverpool.
Savage, F. C., 13, Briggate, Leeds.
Savage, W. W., 109, St. James's Street, Brighton.
Savory, A. L., 143, New Bond Street, W.
Sayer, E. C., 7, Warrington Road, Ipswich.
Scaife, S., 368, Stretford Road, Manchester.
Schlesinger, H. A., 11, Warren Road, Chingford, Essex.
Scott, W. Stanley (Messrs. Cooper Bros.), Cockermouth.
Scruton, Saml. (Messrs. Raimes & Co.), Micklegate House, York.
Selley, J., 142, Earl's Court Road, South Kensington, S.W.
Senior, J., 2, Compton Street, Eastbourne.
Seyler, Clarence A., B.Sc., F.I.C., The Technical Institute, Nelson Terrace, Swansea.
Seymour, F. S., The Square, Wimborne.
Shacklady, J., A.C.I.S , 24A, St. James' Road, Liverpool.
Shacklock, J. H., 239, Streatham High Road, S.W.
Sharp, Gordon, M.D., 3, St. George's Terrace, Camp Road, Leeds.
Sharp, Wm., 24, Esplanade, Whitley Bay, Northumberland.
Sharrah, Richard, 38 and 40, Southwark Street, S.E.
Shaw, A., Riddings, Derbyshire.
Shaw, J. W., 4, Edwardes Terrace, Kensington Road, W.
Shenstone, J. C., F.L.S., 13, High Street, Colchester.
Shepheard, W. F. J., F.C.S., 12, Bridge Street Row, Chester.
Shepherd, J. W., Settle, Yorks.
Shorthouse, Herbert S., F.C.S., 144, Edmund Street, Birmingham.
Shuttlewood, W. B., F.C.S., c/o A. S. Watson & Co., 64, Crutched Friars, E.C.
Siebold, Alfred, F.I.C., Eglinton Dyewood Mills, Alloa, N.B.
Silson, R. W., 113, Church Street, Manningham, Bradford, Yorks.
Silverlock, H., 92, Blackfriars Road, S.E.
Simpson, H. D., 2, New Street, Louth, Lincs.
Skyrme, Chas. Geo., 4, Norman Street, St. Leonard's-on-Sea.
Slann, Ll., York House, 87, Dawes Road, Fulham, S.W.
Smiles, J., Blanchfield Chemical Works, Canonmills, Edinburgh.
Smiley, John A. R., 109, Eccles Old Road, Pendleton, Manchester.
Smith, Arthur R., Owens College, Manchester.
Smith, F. A. Upsher, Briarfield, Chatsworth Road, Chesterfield.

Smith, Fredk., 221, Soho Road, Handsworth, Birmingham.
Smith, J., 22, Chapel Road, West Norwood, S.E.
Smith, John, 3, Terenure Road, Dublin.
Smith, J. Collett, 9, Boscombe Road, Uxbridge Road, London, W.
Smith, J. H., 227, Commercial Road East, E.
Smith, J. L., 180, High Street, Pendleton, Manchester.
Smith, T. Connell, 22, City Road, E.C.
Smith, Tenison, Top of Union Street, Ryde, Isle of Wight.
Smithson, John, 1, Preston Road, Brighton.
Solomon, Albert H., 75, Holland Road, Kensington, W.
Southall, A., F.C.S., Richmond Hill, Edgbaston, Birmingham.
Southall, A. Wm., Lower Priory, Birmingham.
Spence, Alexander, 133, High Street, Linlithgow.
Squire, G., 19, Haymarket, Sheffield.
Squire, P. W., F.L.S., F.C.S., 413, Oxford Street, W.
Stacey, H. G., F.L.S., F.C.S., 300, High Holborn, W.C.
Stainer, J., J.P., 59, Sandgate Road, Folkestone.
Stamp, E. B., 29, High Street, Hampstead, N.W.
Stamp, F. U., 29, High Street, Hampstead, N.W.
Starkie, R. S., 126, Strand, W.C.
Stead, J. Christopher, F.C.S., 42, Grove Green Road, Leytonstone, N.E.
Stevens, P. A., 72, Mansfield Road, Gospel Oak, N.W.
Stevenson, H. E., 4, Jewry Street, E.C.
Stevenson, Henry E., F.C.S., 155, Coventry Road, Ilford.
Stevenson, Sir Thos., M.D., F.I.C., F.C.S., 160, Streatham High Road, S.W.
Stewart, A. K., 1, Lynedoch Place, Edinburgh.
Stickland, W. H., 23, Cromwell Place, South Kensington, S.W.
Stiles, M. H., F.R.M.S., 2, French Gate, Doncaster.
Stockman, Prof. R., M.D., F.R.C.P.E., The University, Glasgow.
Stoker, G. N., F.I.C., F.R.M.S., Fairfield, Lissur Avenue, Clapham Common, S.W.
Stones, W., 7, Ardwick Green North, Manchester.
Storey, E. H., 42, Castle Street East, Oxford Street, W.
Storrar, D., 228, High Street, Kirkcaldy, N.B.
Strongitharm, W. G., 112, Upper George's Street, Kingstown, Co. Dublin.
Stuart, C. E., B.Sc., 29, Mosley Street, Newcastle-on-Tyne.
Sturton, J. G., 42, Bridge Street, Peterborough.
Sturton, R., 6, Park Terrace, Cambridge.
Suddaby, J. E. S., 344, Hessle Road, Hull.
Sudlow, R. C., Snow Hill Buildings, E.C.
Sutcliffe, W. J., 3, St. James Street, Bacup.
Sutherland, J. W., 127, Buchanan Street, Glasgow.
Sutton, F., F.I.C., F.C.S., Norfolk and Suffolk County Laboratories, Norwich.
Swinton, Thos Henry, 16, Irlam Road, Bootle, Liverpool.
Swire, J., King Cross, Halifax.
Symes, C., Ph.D., F.C.S., 14, Hardman Street, Liverpool.

Tanner, A. E., F.C.S., Westminster Hospital, S.W.
Taylor, A. L., The Dispensary, Royal Infirmary, Bristol.
Taylor, C. Sansom, 224, Evering Road, Upper Clapton, N.E.
Taylor, F. W., 36, High Street, Newport Pagnell.
Taylor, G. S., F.C.S., 13, Queen's Terrace, St. John's Wood, N.W.
Taylor, John, J.P, F.L.S., F.C.S., 15, Lucius Street, Torquay.
Taylor, S., 70, Great George Street, Leeds.

Taylor, Samuel, 3, Market Place, Derby.
Thackray, C. F., 70, Great George Street, Leeds.,
Thomas, J. Arden, College Pharmacy, Bath Road, Cheltenham.
Thompson, C., 159, Stratford Road, Sparkbrook, Birmingham.
Thompson, Edwin (Messrs. Thompson & Capper), 4, Lord Street, Liverpool.
Thompson, H. A., 40, Aldersgate Street, E.C.
Thomson, Isaac W., 19, Bellevue Crescent, Edinburgh.
Thomson, John H., 102, High Street, Lochee, Dundee.
Thomson, W., F.I.C., F.R.S.E., Royal Institution Laboratory, Manchester.
Thomson, W., 153, Byres Road, Glasgow.
Thorp, Walter, B.Sc. (Lond.), F.I.C., Analytical Laboratory, Limerick.
Thresh, John C., M.D., D.Sc., D.P.H., Chelmsford, Essex.
Tickle, T., B.Sc., Public Analyst's Laboratory, Sylvan Road, Exeter.
Tirrell, J., Market Square, Hanley.
Tocher, J. F., F.I.C., F.C.S., 5, Chapel Street, Peterhead, N.B.
Tocher, Robt., F.S.M.C., D.B.O.A., 491, Victoria Row, Glasgow.
Tollitt, W., 111, Montague Street, Worthing.
Tomlinson, G. M., Royal Hospital, Sheffield.
Tompsett, Leighton S., 127, Anerley Road, London, S.E.
Toone, Arthur H., 17, Rolle Street, Exmouth.
Toone, J. A., 50, Old Christchurch Road, Bournemouth.
Townsend, Chas., J.P., St. Mary's, Stoke Bishop, Bristol.
Townsend, Wm., Little Queen Street, Exeter.
Truman, Frank W., 71, Old Kent Road, S.E.
Truman, H. Vernon, 8, Parsonage Street, Dursley, Glos.
Tupman, H. Wyke, 6, Montague Street, Worthing.
Turnbull, H. J., Tavistock Works, Sunderland.
Turner, C. W., 12, Foregate, Worcester.
Turner, G. T., "Lynne," Osborne Road, Clifton, Bristol.
Turner, J. Scriven, 20, Bury Street, Great Russell Street, W.C.
Turner, J. W. J., 118, The Moor, Sheffield.
Turney, J. Davy, 15, Leigham Terrace, Plymouth.
Turver, C. H., 40, Market Street, Blackpool.
Tweedy, S. C. G., St. Bartholomew's Hospital, London, E.C.
Twinberrow, John, Elbury House, Elbury, Worcester.
Twiss, W., Hunstanton, Norfolk.
Tyrer, Chas. T., Stirling Chemical Works, Abbey Lane, Stratford, E.
Tyrer, Thos., F.I.C., F.C.S., Stirling Chemical Works, Abbey Lane, Stratford, E.

Umney, C., F.I.C., F.C.S., 48 & 50, Southwark Street, S.E.
Umney, E. A., 48 & 50, Southwark Street, S.E.
Umney, John C., F.C.S., 48 & 50, Southwark Street, S.E.

Vallance, A. C., Rowley Bank, Ecclesmere Park, Eccles.
Vallet, C. E. Franklin, 1, Victoria Villas, High Road, Gunnersbury, W.
Vinden, Fredk. W., Mount Radford, Exeter.
Voce, W. G., 52, Halesowen Road, Netherton, near Dudley.
Vogt, Geo., 30, Highgate, Kendal.

Wakeham, C., Helston, Cornwall.
Walker, James, 51, Hudson Street, Tyne Dock, South Shields.

Walker, James D., 5, Alvanley Terrace, Bruntsfield Links, Edinburgh.
Walker, John, 32, Virginia Street, Glasgow.
Walker, J. F., M.A., F.I.C., F.C.S., 45, Bootham, York.
Walker, William, Downfield, by Dundee.
Wallis, T. E., B.Sc Lond., A.I.C., 29, Finsbury Park Road, N.
Walmsley, S. E., 8, Surbiton Park Terrace, Kingston-on-Thames.
Walsh, Dr. J. A., 30, Westmoreland Street, Dublin.
Walton, R., 73, High Street, Maidenhead.
Want, W. Phillip, 44, Bishopsgate Street Without, E.C.
Ward, G., F.I.C., F.C.S., Millgarth Mills, Leeds.
Ward, J., 39, Eastgate Street, Gloucester.
Wardleworth, Theo. H., 56, Hanover Street, Liverpool.
Waring, A. W., 3, Bucklersbury, E.C.
Warren, W., 24, Russell Street, Covent Garden, W.C.
Warrick, F. W., 6, Nile Street, City Road, E.C.
Watson, David, 41, Sinclair Drive, Langside, Glasgow.
Watson, F. P., F.C.S., 6, Bailgate, Lincoln.
Watson, J. E. H., Rose Corner, Norwich.
Watt, Geo. A., 20, Lynn Street, West Hartlepool.
Watts, Wm., 5, James Street, Crieff.
Weaver, A. C., 42, Dudley Road, Wolverhampton.
Webb, E. A., 60, Bartholomew Close, E.C.
Webb, E. F., Sun Street, Hitchin.
Weddell, George, 20, West Grainger Street, Newcastle-on-Tyne.
Weld, C. Corning, Snow Hill Buildings, Holborn Viaduct, E.C.
Wellcome, H. S., Snow Hill Buildings, Holborn Viaduct, E.C.
Wellings, Wm., 56, Hanover Street, Liverpool.
Wells, W. F., Ph.C., 20, Upper Baggot Street, Dublin.
Weston, S. J., 151, Westbourne Terrace, W.
Whigham, R. L., 22, Brook Street, Bond Street, W.
White, Arthur F., 61, Sunbridge Road, Bradford, Yorks.
White, Edmund, B.Sc., F.I.C., 16, Cross Street, Hatton Garden, E.C.
White, Jas. W., F L.S., Warnham, 18, Woodland Road, Clifton, Bristol.
White, Thomas, 8, Prince of Wales Terrace, Bray, Co. Wicklow.
White, Thos. A., Elm Grove, Southsea.
White, W. Carter, F.C.S., 58, Bunhill Row, E.C.
Whitfield, J., F.C.S., 113, Westborough, Scarborough.
Whittle, Jas., F.C.S., 30, Bridge Street, Morpeth.
Whyte, J. S., 57, Guthrie Port, Arbroath, N.B.
Wiggins, H., 236, Southwark Park Road, S.E.
Wigginton, A., 137, Sloane Street, S.W.
Wild, John, 307, Oxford Street, Manchester.
Wild, Sydney, 76, Mill Street, Macclesfield.
Wilford, J., 52, Milton Street, Nottingham.
Wilkinson, B. J., 7, Middleton Road, Kingsland, N.E.
Willcock, F. A., 71, Victoria Street, Wolverhampton.
Will, W. Watson, F.C.S., 1, St. Agnes Place, Kennington Park, S.E.
Willan, R., 5, Market Street, Ulverston.
Williams, Jesse, Park Hall Buildings, Queen Street, Cardiff.
Williams, H. G., 118, The Moor, Sheffield.
Williams, T. R., Norton House, St. John's Road, Penge, S.E.
Williams, W. G., Old Colwyn, Conway Bay.
Williamson, F. A., Moor Park Pharmacy, Garstang Road, Preston, Lancs.
Williamson, J., 55, Western Road, Hove, Sussex.
Williamson, W. H., "Clovelly," Hawthorn Lane, Wilmslow, Manchester.
Wills, G. S. V., Westminster College, Trinity Square, Boro', S.E.

Wilson, H., F.I.C., 146, High Street, Southampton.
Wilson, Harold, B.Sc., St. Thomas' Hospital, S.W.
Wilson, J., 11, George Street, Bath.
Wilson, J. H., J.P., C.C., The Knowle, Harrogate.
Wilson. Wm. Potter, 36, High Street, Haddington, N.B.
Wing, G. N., 29, Market Place, Melton Mowbray.
Wokes, T. S., Grassendale, near Liverpool.
Wolstenholme, Alfred, Woodhouse, Nr. Sheffield.
Wood, A., New Brentford, Middlesex.
Wood, Wm., 2, Tower Road, Dartford, Kent.
Wooddisse, Frank B., Kenilworth.
Woodhead, S. A., B.Sc., F.I.C., F.C.S., The College, Uckfield, Sussex.
Woods, W. H., 50, Bedford Street, Plymouth.
Woodward, H. K., 7, Bull Green, Halifax.
Woodward, M. Mellor, 53, London Road, Reigate.
Woollcombe, Dr. Robert Lloyd, M.A., LL.D. (Dublin Univ.), LL.D. (Royal Univ.), F.I.Inst., F.S S , M.R.I.A., F.R.S.A. (Ireland), Medical Student (T.C.D.), Barrister-at-Law, 14, Waterloo Road, Dublin.
Woolley, E. J., Victoria Bridge, Manchester.
Woolley, G. S., Victoria Bridge, Manchester.
Woolley, Hermann, Victoria Bridge, Manchester.
Woolley, S. W., 91, Southwood Lane, Highgate, N.
Woollons, C. H. F., 28, Kilburn Lane, W.
Wootton, A. C., Barrymore, Fallow Corner, North Finchley, N.
Wootton, H., B.Sc., London College of Pharmacy, 323, Clapham Road, S.W.
Worfolk, G. W., 16, Brook Street, Ilkley.
Worrall, J. H., F.I.C., F.C.S , Howsley, Chapeltown, nr. Sheffield.
Wrenn, W. A., F.C.S., 15, East Street, Taunton.
Wright, A., A.K.C., 13, High Street, Yeovil, Somerset.
Wright, G., 102, High Street, Burton-on-Trent.
Wright, H. C., 48 & 50, Southwark Street, S.E.
Wright, R., F.C.S., 11, Eagle Parade, Buxton, Derbyshire.
Wyatt, Harold, 223, Stanley Road, Bootle, Liverpool.
Wyborn, J. M., F.C.S., 59, Moorgate Street, E.C.
Wyley, W. F., Wheatley Street, Coventry.
Wyman, J. S., 58, Bunhill Row, E.C.
Wynne, E. P., 7, Pier Street, Aberystwith.

Yates, C. G., 9, Upper Hamilton Road, Brighton.
Yates, D., 32, Darwen Street, Blackburn.
Young, E. F., 67, Wells Road, Bristol.
Young, J. Rymer, F.C.S., 40, Sankey Street, Warrington.
Young, J. R., 38, Chalmers Street, Lauriston, Edinburgh.
Young, J. R., Junr., 18, Comeragh Road, W. Kensington, W.
Young, R. F., Lindum House, New Barnet.

NOTICE.

Members are requested to report any inaccuracies in these lists by letter, addressed as follows:—

The Asst. Secretary,
Brit. Pharm. Conf.,
17, *Bloomsbury Square,*
London, W.C.

PROGRAMME OF THE PROCEEDINGS
OF THE
BRITISH PHARMACEUTICAL CONFERENCE
AT THE
FORTY-SECOND ANNUAL MEETING, BRIGHTON, 1905.

OFFICERS.

President. W. A. H. NAYLOR, F.I.C., F.C.S., London.

Vice-Presidents.

(Who have filled the office of President.)

JOHN ATTFIELD, Ph.D., F.R.S., F.I.C., F.C.S., Watford.
S. R. ATKINS, J.P., Salisbury.
CHAS. UMNEY, F.I.C., F.C.S., London.
OCTAVIUS CORDER, Norwich.
N. H. MARTIN, F.R.S.E., F.L.S., Newcastle-on-Tyne.
C. SYMES, Ph.D., Ph.C., F.C.S., Liverpool.
J. C. C. PAYNE, J.P., M.P.S.I., Belfast.
E. M. HOLMES, F.L.S., Ph.C., London.
G. C. DRUCE, M.A., F.L.S., Oxford.
T. H. W. IDRIS, L.C.C., J.P., F.C.S., London.

Vice-Presidents.

R. A. ROBINSON, L.C.C., J.P., London.
D. B. DOTT, F.R.S.E., F.I.C., Edinburgh.
JOHNSTON MONTGOMERY, Belfast.
W. H. GIBSON, F.C.S., Brighton.
F. RANSOM, F.C.S., Hitchin.
Prof. HENRY G. GREENISH, F.L.S., F.I.C., London.

Honorary Treasurer. JOHN C. UMNEY, F.C.S., London.

Honorary General Secretaries.

E. SAVILLE PECK, M.A., Cambridge. | EDMUND WHITE, B.Sc., F.I.C., London.

Honorary Local Secretaries.

W. W. SAVAGE, C. G. YATES.

Assistant Secretary.

JOHN HEARN.

Other Members of the Executive Committee.

H. ANTCLIFFE, Sheffield.
F. C. J. BIRD, London.
H. W. GADD, Exeter.
D. LLOYD HOWARD, F.C.S., London.
W. H. MARTINDALE, Ph.D., London.
H. E. MATTHEWS, Bristol.
J. F. TOCHER, F.I.C., F.C.S., Peterhead.
HAROLD WILSON, B.Sc., London.
R. WRIGHT, F.C.S., Buxton.

Auditors.

J. W. BOWEN, London, and W. P. ROBINSON, London.

Editor of the Year-Book. J. O. BRAITHWAITE.

Brighton Local Committee.

*ADAMS, F.
*ASTON, W.
*ASHTON, C. S.
BARTON, H.
BATHE, R. S.
BAYLEY, A. W.
BECK, N. G.
BECKWITH, C.
BECKWITH, E.
*BLACK, H. M.
*BLAMEY, C. A.
BROWN, R. E.
CAMERON, L.
CAIN, J. H.
CHAMBERS, H.
CHURCHILL, H.
COOK, W. B.
CORTIS, A. B.
COSTERTON, H. A.
COX, A. H.
*CRIPPS, R. A.
CUPIT, A. H.
EVERETT, H.
FARR, E. H.
FLATMAN, F. J.
FOWLES, F. W.
*FRANKLIN, A. J.
*GIBSON, W. H.
GREENING, B. C.
GUY, F.
*GWATKIN, J. R.
*HALL, A.
*HARDCASTLE, S. B.
HAYES, R. O.
HEATH, R. P.
HEILETT, F. C.
HISTED, E.
JEEVES, F. A.
LEIGH, MRS MARSHALL
LEVETT, H.
LLOYD, H.
*LONGMAN, J. H.
MARTEN, J. R.
MATTHEWS, J. H.
MERRETT, E. L.
MILLER, J.
PACKER, F. R. E.
*PADWICK, J.
PADWICK, I. K.
PEARS, K.
PEARS, H. W. K.
PLOWRIGHT, A.
*PLOWRIGHT, J.
*ROBINSON, C. E.
ROBINSON, H.
ROYLE, H. W.
SADLER, F. W.
*SAVAGE, G. B.
*SAVAGE, W. W.
SMITH, T. H.
SMITH, W. H.
SMITHSON, J.
WALLIS, E.
WARD, C. T.
WHITE, W. E.
*YATES, C. G.

* *Local Executive Committee.*

THE SITTINGS OF THE CONFERENCE WERE HELD IN

THE CLARENCE ROOMS, HÔTEL MÉTROPOLE, BRIGHTON.

ON TUESDAY AND WEDNESDAY, JULY 25 AND 26, 1905.

TUESDAY, JULY 25.

The CONFERENCE met at 10 a.m., adjourning at 1 p.m.; and at 2 p.m., adjourning at 4 p.m.

Order of Business

Address of welcome by the Mayor of Brighton, Alderman F. Blaker.
President's Address.
Reception of Delegates.
Report of Executive Committee.
Financial Statement.
Reading of Papers and Discussions thereon.

PAPERS.

1. *The Composition of Dentrifices as affected by recent investigations in Dental Science*, by STANLEY READ, L.D.S.E.
2. *The Bio-Chemical Standardisation of Drugs*, by W. E. DIXON, M.D. (Lond.), M.A. (Cantab.).
3. *Standardisation in the new United States Pharmacopœia*, by T. MABEN, F.C.S.
4. *The Essential Oils of the new United States Pharmacopœia*, by J. C. UMNEY, F.C.S., and C. T. BENNETT, F.C.S.
5. *Quinine Acid Hydrochloride*, by W. GARSED.
6. *Compound Tincture of Gentian*, by F. H. ALCOCK, F.I.C.
7. *The Ash of Myrrh*, by F. H. ALCOCK, F.I.C.
8. *The Flora of Sussex*, by G. CLARIDGE DRUCE, M.A. (Oxon.).
9. *Further Notes on Radio-Activity*, by W. H. MARTINDALE, Ph.D.

WEDNESDAY, JULY 26.

The CONFERENCE met at 9.45 a.m., adjourning at 1 p.m.; and at 2 p.m., adjourning at 3.30 p.m.

Order of Business.

PAPERS.

10. *The Examination of some Commercial Concentrated Infusions*, by R. A. CRIPPS, F.I.C.
11. *Decoctum Aloes Co. Concentratum*, by R. A. CRIPPS, F.I.C.
12. *The Pharmacy of Capsicum*, by A. W. GERRARD, F.C.S.

13. *The Assay of Compound Tincture of Camphor,* by F. C. J. Bird.
14. *The Chemistry and Pharmacy of the Leaves of Viola Odorata,* by H Wippell Gadd, F.C.S.
15. *Laboratory Notes :*
    (a) *Nux Vomica Seeds.*
    (b) *The Assay of Cinchona Bark.*
    (c) *The Manufacture of Ferrous Carbonate,* by Sydney C. Gadd.
16. *Castor Oil,* Part I, by H. Finnemore, A.I.C., and Harold Deane, B.Sc. (Lond.), A.I.C.
17. *Amateur Laboratory Construction,* by E. W. Pollard, B.Sc. (Lond.).
18. *Tragacanth and Acacia : Comparative Viscosity of the Simple and Mixed Mucilages,* by Edmund White, B.Sc. (Lond.), F.I.C.
19. *Mercuric Zinc Cyanide,* by D. B. Dott, F.R.S.E., F.I.C.
20. *Arsenious Iodide,* by R. C. Cowley and J. P. Catford.
21. *Report upon the results obtained from the Analysis of Pharmaceutical Preparations by the Union Analysts of the Poor Law Unions of Ireland in the year ended March* 31, 1905, by J. E. Brunker, M.A. (Dubl.).

GENERAL BUSINESS.

Presentation from the "Bell and Hills Fund."
Place of Meeting for 1906.
Election of Officers for 1905-1906.

THURSDAY, JULY 27

Excursion to Arundel. For particulars see page 506.

BRITISH PHARMACEUTICAL CONFERENCE.

MEETING AT BRIGHTON, 1905.

The undermentioned visitors signed the Attendance Book :—

Aberdeen—Giles, W. ; Kay, J. P.

Altrincham—Unsworth, A. ; Unsworth, J. W.

Barnet—Young, R. F. ; Hayles, B. H.

Bath—Hallett, W. J.

Beckenham—Parsons, W.

Bedlington—Foggan, Mr. and Mrs. G.

Belfast—Gibson, W. J., and Miss Gibson ; Nicholl, J. W.

Birmingham—Alcock, F. H. ; Smith, F. ; Thompson, Mr. and Mrs. C.

Blandford—Groves, R. H.

Boscombe—Rose, Mr. and Mrs. F.

Bradford—Hanson, Mr. and Mrs. A.

Brighton and Hove—Adams, F. ; Allen, H. M. ; Andrews, S. H. ; Andrews, Mr. and Mrs. W. H. ; Andrews, E. ; Ashton, C. S. ; Beckwith, C. ; Beckwith, Ernest ; Beckenham, C. ; Black, H. M. ; Blaker, M. ; Blamey, Mr. and Mrs. C. A. ; Bown, Dr. J. Q. ; Cook, Mr. and Mrs. W. R. ; Costerton, F. C. ; Cripps, R. A. ; Franklin, A. J. ; Gibson, W. H. ; Gibson, Ida ; Gibson, Edith C. ; Goodall, F. C. ; Griffiths, C. ; Guy, Mr. and Mrs. F. ; Gwatkin, Mrs. E. F. ; Gwatkin, Grace ; Gwatkin, H. R. ; Gwatkin, J. R ; Hall, A. ; Hardcastle, Mr. and Mrs. S. B. ; Heath, J. L. ; Miller, J. ; Padwick, J. ; Plowright, J. ; Ransom, Miss ; Read, Stanley ; Robinson, C. E. ; Savage, E. D. ; Savage, G. B. ; Savage, Mr. and Mrs. W. W., and Misses Beatrice and Marion Savage ; Smith, J. H. ; Whittle, E. G. ; Yates, C. G. ; Yates, E.

Bristol—Boorne, H. E. ; Kirby, F. B. ; White, Mr. and Mrs. Jas. W.

Cambridge—Dixon, Dr. W. E. ; Peck, E. Saville.

Cardiff—Hagon, Albert, and Miss R. Hagon.

Cheltenham—Barron, W.; Thomas, J. A.

Chesterfield—Smith, F. A. Upsher.

Croydon—Ashton, Mr. and Mrs. F. W.

Dover—Ewell, R. M.

Dowlais—Rees, R. P.

Dublin—M'Walter, Dr. J. C.; Watson, D. W.; Wells, W. F.

Dundee—Anderson, J.; Russell, J., and Miss Russell.

Eastbourne—Gibbs, S.; Harmer, G. A.

Edinburgh—Cowie, Mr. and Mrs. W. B.; Duncan, W.; Glass, Julia; Hill, J. Rutherford; Mair, W.

Elland—Garsed, Gertrude.

Enfield—Goldby, F.

Exeter—Gadd, H. Wippell; Gadd, Sydney C.; Lake, J. Hinton.

Glasgow—Brodie, R.; Gilmour, J. P.; Sutherland, J. W.

Godalming—Mather, J. H.; Norman, V.

Gravesend—Clarke, R. Feaver, and the Misses Clarke.

Haddington—Wilson, W. P.

Hitchin—Ransom, Mr. and Mrs. F.

Ilkley—Worfolk, G. W.

Kilmarnock—Merson, Mr. and Mrs. Geo. F.

Kirriemuir—Ford, Jas.; Ford, Jessie.

Leeds—Beacock, H.; Pilkington-Sargeant, Mr. and Mrs. F.

Leyton—Brewis, E. Theo.

Littlehampton—Longman, Mr. and Mrs. J. H.

Liverpool—Symes; Dr. and Mrs.

Long Metford—Lenton, Mr. and Mrs. W. H.

Louth—Simpson, H. D.

London—Arrowsmith, A. R.; Atkinson, Mr. and Mrs. Leo; Bascombe, F.; Bennett, R. R.; Bird, F. C. J.; Bremridge, R.; Chalmers, W.; Cooper, A.; Crawshaw, E.; Cresswell, F.; Deane, H.; Finnemore, Mr. and Mrs. H.; Francis, Alan; Frost, S. T.; Garsed, W.; Gerrard, A. W., and Miss Gerrard; Glyn-Jones, Mr. and Mrs. W. S.; Goldfinch, G.; Goodall, J. C.; Gossop, Geo. K.; Harrington, J. F.; Harrison, E. F.; Hearn, J.; Howie, W. L.; Howard, D. L.; Humphrey, J.; Idris, Mr. and Mrs. T. H. W.; Idris, W. J. W.; Layman, C. N., and Miss Layman; Lescher, F. H.; Lucas, E. W.; Maben, L. M.; Maben, T.; Martindale, Dr. and Mrs. W. H.; Naylor, W. A. H.; Robinson, R. A.; Rogers, F. A.; Sangster, A.; Shacklock, J. H.; Smith, Mr. and Mrs. J. H.; Solomon, Albert H.; Tompsett, L. S.; Umney, Mr. and Mrs. John C.; Want, W. P.; Warren, W.; Weston,

S. J.; White, Mr. and Mrs. Edmund; Widdowson, T. S.; Woolley, S. W.; Wootton, A. C.

Luton—Chantler, Ethel.

Manchester—Franklin, J. H.; Johnstone, C. A.; Kemp, Harry; Pidd, A. J., and Miss Pidd; Wild, J.

Oxford—Druce, J. Claridge.

Peebles—Lindsay, Mr. and Mrs. J. R.

Preston—Plowright, A.

Plymouth—Barge, Mr. and Mrs. J.

Queenstown, S. Africa—Mager, W. K.

Ryde (*I.W.*)—Pollard, E. W.

Salisbury—Atkins, S. R.

San Remo—Squire, Frank R.

Seaford—Cameron, L.; Cameron, L., jun.

Sheffield—Antcliffe, H.; Carr, Percy; Newsholme, Mr., and Mrs., and the Misses Newsholme; Williams, H. G., and Miss Williams.

Shipley—Bayley, G. H.

Shrewsbury—Cross, Mr. and Mrs. W. Gowen; Cross, W. Gowen, jun.

Tunbridge Wells—Hobbs, A. E.; Howard, Mr. and Mrs. G. W.

Uckfield—Farr, E. H.

Ventnor—Dunning, J.

Watford—Attfield, Dr. J.

Wigan—Phillips, Mrs. A.; Phillips, J.

Worcester—Twinberrow, J.

Worthing—Aston, Mr. and Mrs. W.

GENERAL MEETING.

Tuesday, July 25, 1905.

The Sessions of Conference began at 10 a.m. on Tuesday, July 25, in the Clarence Rooms, Hôtel Métropole. The President, Mr. W. A. H. Naylor was supported by the Mayor of Brighton, Alderman Blaker, J.P.; Mr. R. A. Robinson, President of the Pharmaceutical Society; Dr. Gervis, Brighton; Dr. J. Attfield, Dr. Charles Symes, and Messrs. S. R. Atkins, G. C. Druce, W. H. Gibson, J. C. Umney, E. Saville Peck, and E. White.

The **President** said: Ladies and gentlemen, we are favoured this morning with the presence of the Mayor of the borough, Mr. Alderman F. Blaker, and he will address a few words of welcome to us.

The MAYOR: Mr. President, Vice-President, ladies and gentlemen, my duty is short and a very pleasant one—that is, to offer to you the most cordial welcome I possibly can in the name of Brighton to what we call "The Queen of Watering Places." I need hardly say that I hope the weather will be all that you can wish yourselves, and I hope that the deliberations, which are the cardinal consideration of your coming here, will bear such fruit as your annual meetings have always done. This is the forty-second annual meeting that you have held, and I have no doubt that your position is stronger to-day than when you started. In the name of Brighton I do heartily welcome you to our town.

The PRESIDENT: Mr. Mayor, in the first place will you allow me to discharge a duty of a retrospective character: to thank you most heartily for the magnificent reception which you gave us last evening, and for the hospitality which you were good enough to extend to us. The historic associations connected with the building in which it was our privilege to gather enhanced considerably the pleasure of the occasion and gave to it an added charm. Will you allow me to say that we regard it as a distinct honour that you should have come amongst us this morning, because we know that you must be a very busy man, and you must have done it at some amount of personal sacrifice. We, therefore, express to you our very sincere thanks for the welcome which you have given to us, and I am sure you will not measure the extent of our gratitude by the fewness of the words with which we express it. We appreciate very highly the kind office you have performed this morning, and we also thank you for your good wishes for a most successful meeting.

Dr. GERVIS, on behalf of the medical profession in Brighton, also welcomed the Conference to the town. He referred to the meeting of motorists the previous week, and said it was of pharmaceutical interest to know that it was said the pace at which a large motor goes, especially when driven by a lady, was a most effective depilatory, more efficacious than sulphuret of soda or electrolysis. He then referred to the alliance between physician and pharmacist as pursuing separate branches of the healing art, and spoke in highly appreciative terms of chemists of Brighton, both as pharmacists and as public men. He concluded by referring to the "three airs of Brighton," and gave the following prescription :—

℞ Aeris Brightonii, quantum sufficit.
Misce secundem artem.
Fiat inhalatio. Sæpissime utendum.

Alderman R. A. Robinson thanked the Mayor and Dr. Gervis for their very cordial welcome to Brighton, and said he was sure the members of the Conference heartily reciprocated their good wishes. There were present to welcome the Conference, on behalf of the medical profession, not only Dr. Gervis, but also Dr. Whittle, Dr. Marcus Allen, and Dr. Bown, and it was very pleasant to be met in this kind manner by the medical profession. Dr. Gervis had referred to the Brighton pharmacists as second to none in the kingdom—it might be that demand and supply went together, and it might be that the physicians of Brighton were second to none in the kingdom, and that it had been found desirable that there should be pharmacists able to fulfil the desires and wishes of their medical friends. As to the three airs in Brighton, they would bear in mind what Dr. Gervis had told them, and would take the opportunity of sampling the air in its native purity.

PRESIDENTIAL ADDRESS

THE STANDARDIZATION OF GALENICALS

BY W. A. H. NAYLOR, F.I.C.

After a lapse of thirty-three years the Conference, on the invitation of the Brighton Local Association, is privileged to revisit this popular and fashionable watering-place. As the visiting members will have the opportunity, before the present sessions close, of suitably expressing their feelings to those who have cheerfully charged themselves with the responsibility of providing for their comfort and pleasure, I will refrain from saying more than assuring our hosts that we are delighted to accept their hospitality. It is not unnatural that the temptation to indulge in a series of reflections suggested by the long interval between the meeting of to-day and that of 1872 appeals powerfully to me, but, inasmuch as to yield to it would make it difficult for me to avoid the discussing of burning questions of policy that lie outside the scope of our association, I forbear.

Without exception, my predecessors in this chair have been singularly happy in their choice of a subject on which to base an address, and I shall count myself fortunate if I succeed in discharging my present duty with the same degree of appropriateness and acceptability. A request reached me from a representative source to select for this occasion a topic of general interest to pharmacists; and as it is one which well accords with my sense of propriety and with my feeling of personal fitness, I gladly welcome it. Whether the motive which prompted the request was in part to safeguard me against essaying too ambitious a flight and from the disastrous result which inevitably follows I do not know, but if so, it was the more worthy of consideration.

It may be affirmed without fear of contradiction that the recognition of

THE PRINCIPLE OF STANDARDIZATION

and its embodiment in daily practice marks the most important advance which pharmacy has witnessed within recent years. Standardization, as applied to a crude drug or a preparation, is understood to imply that by a method of appropriate treatment, ascertained by direct experiment, it has been made to conform to a predetermined standard. The required standard may have a physical, chemical, or physiological basis and may have reference either to one or more definite principles or to a mixture of indefinable substances. The object of standardization is to secure uniformity of product, more especially in respect of medicinal activity.

It is not necessary to hark back more than a generation to see the ever-lengthening strides which pharmacy has taken in the direction of plant analysis and the isolation of definite principles. To this fact the text-books on materia medica and lectures of twenty-five years ago bear indisputable testimony. Then the maximum of knowledge of the constituents of even the best known and most potent drugs was summed up in the statement that they contained a crystalline principle, generally an alkaloid, and a few remotely proximate and chemically unclassified substances. Before standardization could be brought within the range of pharmaceutical possibility it was necessary to make a more thorough, systematic, and accurate investigation of crude drugs with a view of obtaining precise information as to the nature of their constituents. To this task the younger generation of workers in the field of pharmaceutical research have mainly directed their efforts. Latterly they have occupied themselves more especially in seeking to devise trustworthy processes for the assay of crude drugs and their preparations, and to the extent to which they have succeeded they have contributed in their measure to the benefits conferred on suffering humanity by the healing art.

ITS APPLICATION.

The 1867 Pharmacopœia gave detailed directions for the evaluation of cinchona bark and of opium, an innovation that constituted the first serious attempt "by authority" in this country to assay crude drugs. In the following Pharmacopœia of 1885 the principle of standardization was extended to a small number of the preparations of official drugs comprising the liquid extracts of cinchona and opium, the extracts of nux vomica and opium and cherry-laurel water. As a beginning, the selection made was warranted alike on chemical and therapeutical grounds, but the choice of the extractive form for nux vomica proved to be singularly unfortunate, as, owing principally to the relative variation in alkaloid content to extractive, it could not be obtained so as to fulfil at the same time the two required conditions of standard strength and pilular consistence. Experience showed that whatever convenience attached to it as a means of making the corresponding tincture it failed to yield the preparation of the uniform strength of 1 grain of alkaloids in 1 fl. oz. In accordance with general expectation, the succeeding Pharmacopœia of 1898 witnessed a further advance of the principle of standardization. The list was extended so as to include a liquid extract of belladonna, from which the alcoholic extract, liniment, plaster, and tincture are directed to be made; simple and compound tincture of cinchona, liquid extract, and tincture of nux vomica—from the former of which the firm extract is to be made —liquid extract of ipecacuanha—from which the wine and vinegar are to be made—and extract, liquid extract, and tincture of opium.

Of the standardized drugs and preparations common to the 1885 and 1898 Pharmacopœias, the processes given for each in the respective editions are characterized for the most part by important alterations. The main difference in the present liquid extract of cinchona is an instruction to repeat the operation of shaking out with benzolated amylic alcohol and to recover the alkaloids by agitation with hydrochloric acid and treatment of the separated acid solution with ammonia and chloroform. In the case, however, of nux vomica, the standardized preparation of which is a liquid extract, the strychnine alone is directed to be estimated, and not, as previously, the mixed alkaloids in the solid extract. In regard to opium morphinated water is now substituted for distilled water for washing the separated alkaloid, the dried alkaloid is titrated, and an allowance made for the loss of alkaloid.

The criticisms that have been made on the processes for standardization in the present Pharmacopœia may be summed up in the statement :—(*a*) unnecessarily complex, (*b*) insufficiently accurate, (*c*) tedious of execution. And as regards opium. "clumsy" from an analytical point of view and objectionable on account of the difficulty of obtaining the required volume of filtrate. It is gratifying to be able to remark that those who have criticized adversely the processes for standardization given in the Pharmacopœia have, as the result of much thought and investigation, made valuable suggestions for their improvement Pharmacy is greatly indebted to those workers in this field of inquiry, who have not only pointed out defects in processes, but who have concurrently contributed so large a volume of useful constructive criticism. For some considerable time I have occupied myself with a comparative study of the official processes for standardization and certain of those published and recommended by researchers as improvements upon them It is with diffidence that I offer my comments, but as they are the outcome of a long series of experiments, I am persuaded that you will admit their claim to submission as justifiable.

BELLADONNA.

It is seldom that the process directed to be used for the liquid extract of belladonna can be carried out in its entirety. The choloroform produces with most samples an emulsion which defies all attempts to obtain a perfect separation of the immiscible alkaloidal solvent. In the majority of these cases a considerable economy of time and labour may be effected by subjecting the extract to a preliminary treatment for the removal of its fat. For this purpose Bird's modified B.P. process may be used with advantage. The preliminary washing with chloroform in acid solution (and subsequent recovery of traces of alkaloid from the chloroformic extract) effects in most cases a complete removal of those substances which favour the formation of emulsions, and as a consequence throughout the whole assay the separations usually take place quickly and are sharply defined. Moreover, the alkaloids obtained by the spontaneous evaporation of the final chloroformic solution are frequently beautifully crystalline and almost colourless, and are found to have a high titration value.

Bird's alternative process, in which the prior treatment with acid is not required, but a solvent composed of amylic alcohol, ether and chloroform is recommended instead of chloroform alone, seems to demand for its successful conduct a liberal endowment of the mechanical ingenuity and manipulative dexterity of its author. This inference is suggested by the fact that of three assistants who in turn made trial of it, all of them experienced in this class of work, each failed to obtain concordant results. Alcock's process—a leading feature of which is a provision for the removal of the fatty matter with ether and the precipitation of resinous substances with chloroform—accomplishes, in a cleanly and satisfactory manner, the object desired, the alkaloids, generally, titrating close upon 100 per cent., being colourless and crystalline. A much-needed amendment of the present process for determining the proportion of alkaloids would consist in including in the description a preliminary treatment for the withdrawal of useless and interfering oleaginous substances.

CINCHONA.

Liquid extract of cinchona, when assayed by the official process, not infrequently gives rise to refractory emulsions, which refuse to break up on long standing in a warm place accompanied by gentle rotation of the separator or after filtering through a pledget of cotton wool.

Here, again, Alcock's modification of the official process in its early stages, which consists chiefly in the substitution of an alcoholic solution of potash for the aqueous one prescribed by the Pharmacopœia, results in a practical solution of the difficulty. His assumption that dilution with water in the first instance aids the formation of emulsions appears to be justified from the rapidity and sharpness that characterize the subsequent separations. By this method the extract can be assayed more expeditiously and the results obtained are more accurate. Contrary to Dewhirst, Stenhouse's process has usually yielded me higher and not lower results than the authoritative standard. Moreover, with certain types of liquid extract the resinous substances which are occasionally precipitated during the later operations greatly delay the final separation.

IPECACUANHA.

To the process for the assay of liquid extract of ipecacuanha as described by the Pharmacopœia the winnowing fan of criticism has been applied with greater vigour and freedom than to any other in connexion with the standardized preparations. The chief charges preferred against it have been loss of alkaloid, principally through retention by the lead precipitate, an inordinate consumption of time required for its execution, and a degree of impurity in the final product which goes far to discount its claim to accuracy. By having recourse to the manipulative modifications suggested by Bird this process may be performed in a reasonable time and accordant results may be obtained.

To Harold Wilson belongs the credit of being the first to point out the defects of the official process and to devise and publish a better. His process is more expeditious and more accurate and, in general, more easy of execution, the exception being where the resinous constituents are thrown out of solution and prolong to tedious length the separation of the immiscible solvent. Alcock's process provides for the removal of interfering substances in the liquid extract before extracting the alkaloids with ether-chloroform; nevertheless, the presence of a flocculent precipitate occasionally makes the separation of the alkaloidal solvent one of considerable difficulty, unless the whole liquid is forced through cotton wool. Of the published methods of assay the only ones which in my hands have yielded uniformly accurate results with every type of liquid extract are those of Farr and Wright and of Naylor and Bryant. Moreover, my experience has shown that the results yielded by Farr and Wright's and Naylor and Bryant's processes respectively are identical within the limits of experimental error. Farr and Wright's statement that their rapid process gives results that are practically accurate is in the main confirmed by my experiments. The fact that the results are generally a little too low is probably due to the retention of traces of alkaloid by the substances insoluble in the acid used for titration. Whatever process may be devised and adopted for inclusion in a future issue of the British Pharmacopœia there can be no doubt that titration of the alkaloidal residue will be insisted upon.

NUX VOMICA.

The process for the assay of liquid extract of nux vomica as set out in the Pharmacopœia shares the defect common to the standardization of the preparations to which reference has been made—that of the difficulty of obtaining a speedy and sharp separation of the solvents employed. Bird's recommendation to remove the fat from the alcohol-free solution by acidifying with dilute sulphuric acid and shaking out with chloroform and subsequently recovering from the latter any traces of alkaloid that may have been retained greatly facilitates the progress of the estimation. The same author has also described a process which is more rapid of execution than that of the Pharmacopœia and which renders unnecessary a preliminary evaporation of the extract, and, further, it includes a modification of the method for washing the alkaloidal ferrocyanides, which, manipulatively considered, is a distinct improvement. Alcock has proposed certain modifications in the earlier stages of the official process by the adoption of which the time ordinarily required for making a determination is materially shortened. This saving of time is an unqualified gain, as it has not been secured at the sacrifice of the alkaloid.

The difficulties attending that part of the official process which refers to the separation of the brucine and strychnine, even assuming the adoption of the minute precautions proposed by Farr and Wright, cannot confidently be affirmed to have been completely surmounted. It is imperative that attention to details of an unusually exacting character be carefully observed if results that claim to be concordant are to be obtained. For example, the solution during the addition of the ferrocyanide must be well agitated, but not stirred, and must be maintained for a considerable time at an elevated and restricted temperature, otherwise portions of brucine will be precipitated with the strychnine. The most serious drawback to the process is the loss of strychnine consequent on giving effect to the prescribed instructions to wash the precipitate until the washings are free from bitterness. On drying the extracted strychnine further loss will occur unless the suggestion to moisten it with ethylic or amylic alcohol or other liquid answering the same purpose be acted on, or some other equally effective method be employed. Unless exactly similar conditions are constantly observed the loss of alkaloid is sufficiently variable to vitiate the results. To an analyst working under precisely similar conditions on the same sample of extract a number of assays may yield him the same percentage product, while the same extract in the hands of several analysts each equally competent as the first, assayed by the process with due observance of its details, will generally yield a percentage product differing within limits too wide to be credited with concordancy of result.

Dowzard has worked out a method for the assay of this liquid extract in which the separation of the isolated and mixed alkaloids is based on the ease with which the brucine and the difficulty with which the strychnine under well-defined conditions are acted upon by nitric acid. By a simple adaptation of the process the total alkaloids and the individual alkaloids can be conveniently and directly determined in the same sample. If the instructions given are carefully followed accurate results are obtained and the strychnine extracted is free from brucine. A considerable experience has convinced me that a satisfactory and more expeditious process for the assay of nux vomica preparations and one suited to the requirements of the professional pharmacist could be easily devised by adopting either Alcock's or Bird's method of extracting and purifying the mixed alkaloids and subsequently separating the strychnine by nitric acid as described by Dowzard.

OPIUM.

The description given in the Pharmacopœia of the morphimetric process for opium is, in my judgment, a model of clearness and of attention to detail. Occasionally the opportunity has been afforded me of placing the process in the hands of a trained pharmacist who has not had previous experience of it, and in each case he has obtained results agreeing with the known percentage of alkaloid to the second place of decimals. It may be concluded, therefore, that, assuming it to be accurate, it is well adapted for the professional pharmacist. To the wholesaler who may be required to examine a number of samples and to whom time is a monetary consideration, and its too liberal consumption may cause him to lose his market, it is too lengthy. On the score of economy of both time and material the process of Dowzard is to be preferred. The more recently published one of Dott, although excellent in many respects, possesses the disadvantage of requiring eighteen hours for the precipitation of the morphine.

On comparing the percentage of morphine returned on a given sample of opium by manufacturers of the alkaloid with that found by me by the Pharmacopœia process, the inference to be deduced is that the latter yields too low results by nearly one-fifth per cent., notwithstanding Dott's statement that the estimated morphine is one-fiftieth more than it ought to be. The difficulty of obtaining the officially prescribed 104 c.c. of filtrate is a distinct and recognized drawback. The instruction to measure the 104 c.c. in a wide-mouthed bottle of 300 c.c. capacity does not conduce to accuracy and is probably rarely followed. A flask with a long, narrow neck, with a mark on it indicating the required volume, would enable the instruction to be carried out with the needed exactitude. A further drawback, to which attention does not seen to have been drawn, is that the mass of precipitated morphine after drying is not of uniform composition throughout, and in consequence there is a small but variable error in the percentage of morphine calculated on the result of the titration of an aliquot quantity.

Since these statements were penned. Lenton has placed on record the observation that "the crude morphine precipitate after washing and drying is not altogether homogeneous." Referring to the titration of the morphine from the tincture, he remarks that, "although, presumably, the 0·3 gm. taken for the titration of the morphine from the bulk, it is by no means certain that such is the case." It has been suggested by various authorities that the morphine should be titrated in the moist state and the lengthy and tedious process of drying dispensed with. From experiments which I have made it appears that if the morphine is washed until free from traces of ammonia it can be safely titrated in the manner suggested by Dowzard without previous drying.

STORAGE OF GALENICALS.

To what extent are the standardized preparations, the processes for which have been passed under review, liable to loss of active principles by chemical change or precipitation when stored under proper conditions? The question is pertinent, and the published data bearing on the inquiry are scanty and barely sufficient to supply a completely satisfactory answer. My experience has taught me that varying conditions of storage will produce varying changes in the preparations, a behaviour which is characteristic of the large class of galenicals to which they belong. Under the same conditions of storage they are not equally affected. The preparations of nux vomica and belladonna appear to be the most stable, the cinchona preparations less so, and the liquid extract of ipecacuanha the least of all. This assumption is supported by the figures showing percentage losses of alkaloids during the storage of the standardized preparations -- belladonna excepted --given in a paper contributed by Huxtable and myself to the Dundee meeting of the Conference. Since then observations have been continuously made, and examinations conducted at short intervals enable me to confirm the order in which I have placed the several preparations in respect of alkaloidal stability. There is small, if any, doubt that the loss referred to is in each case most largely due to precipitation. Whatever, therefore, is likely to have the effect of encouraging deposition should be carefully noted and avoided. Suffer me to weight the statement with all the emphasis it will bear that we,as pharmacists, cannot bestow too great thought and care upon the storage of important preparations, which, even when kept under the most favourable conditions, are not free from the liability of a reduction in strength and consequent medicinal value.

From the favourable reception which has been accorded the series of standardized preparations, it is safe to assume that the question of increasing the number in the next edition of the British Pharmacopœia will receive from the Medical Council the fullest consideration. Other drugs containing known and approved active principles will undoubtedly form the subject of experiment with the twofold object of embodying their remedial properties in preparations alike convenient and permanent and arriving at suitable processes for determining their therapeutic strengths. I make no apology and affect no originality for canvassing the claims of the following to this form of recognition.

Calabar Bean.

So long as a preparation of Calabar bean intended for internal use finds a place in the British Pharmacopœia it should, as far as present knowledge admits, be assayed in respect of its alkaloidal content. The most recent investigations indicate the presence of the three bases in the bean—eserine, eseridine, and eseramine. The non-existence of calabarine therein can no longer be a matter of doubt. Of these alkaloids eserine is supposed to represent the therapeutical properties on which the physician depends when he prescribes the official extract. It has been proved by a series of experiments that eseridine can claim no special advantage over eserine, and that if not identical in action with it, in the main it is not distinguishable from it. The relative proportions in which the several alkaloids exist in the bean do not appear to be known with any degree of precision. As commercial extracts of the bean made with rectified spirit have been shown by MacEwan to contain from 1 to 10 per cent. of total alkaloid, this fact may be adduced as sufficient evidence for the necessity of standardizing, if only for total alkaloid, the extract of the Pharmacopœia.

CONIUM.

It is generally understood that coniine, ethyl piperidine, methyl coniine, conhydrine, and pseudo-conhydrine are present in conium, and that to one or more of these alkaloids the drug owes its medicinal properties. From the experiments of Findlay we may conclude that the fluid extract of conium and the mixed alkaloids act in a physiologically analagous manner to pure coniine. The same authority found that coniine is but slightly more active than the mixed hemlock alkaloids, whilst conhydrine and pseudo-conhydrine are much weaker. Coniine may, therefore, be regarded as the active principle of conium, the other alkaloids not existing in large enough proportions to greatly modify its action.

That conium preparations are subject to variations in strength has been shown by several pharmacists, and processes have been devised for the estimation of the mixed alkaloids therein. A standard for total alkaloids would satisfy all practical purposes, and probably further investigations will show that the process described in the " B. P. C. Formulary," 1901, under " Extractum Conii Liquidum " needs little amendment to make it applicable to the official tincture.

HENBANE.

Henbane leaves contain at least two bases—viz. hyoscyamine and hyoscine. Scopola root contains two bases—(*a*) scopolamine, optically active, which is identical with hyoscine, and (*b*) scopolamine, which is optically inactive and which is identical with Hesse's atroscine.

According to Hesse, hyoscine (optically active scopolamine) in alcoholic solution containing a trace of alkali is quickly changed into atroscine (optically inactive scopolamine.) In devising a process for the estimation of the total basic content as it exists in the leaves of henbane it is advisable that regard should be had to the comparative ease with which hyoscine undergoes isomerisation. Whether a change in the molecular constitution of the alkaloid does or does not affect its therapeutic value, it is desirable from the chemist's point of view that any such alteration should be guarded against and, as far as possible, provision made accordingly in any process recommended for the assay of the drug or its preparations.

JABORANDI.

Having regard to our present state of knowledge of the chemistry and physiology of the active constituents of this drug, the question arises whether it is sufficient to justify a recommendation for the standardizing of its official preparations. From the latest investigations we are warranted in inferring that true jaborandi (*Pilocarpus jaborandi*) contains at least two alkaloids—pilocarpine and isopilocarpine—and probably a third base—pilocarpidine. Merck has obtained pilocarpidine from *Pilocarpus pennatifolius*, while Jowett has failed to isolate it from *Pilocarpus microphyllus*. It may be affirmed, therefore, that the chief alkaloidal constituents existing naturally in the jaborandi of commerce are pilocarpine and isopilocarpine, which are isomeric bodies.[1] Jowett states "that as regards the assay of jaborandi preparations it is possible to determine the amount of alkaloid contained therein with a fair degree of accuracy. The information, however, is of little value, for it gives no indication of the amount of pilocarpine contained in the total alkaloid, and it must be assumed that on the pilocarpine alone depends the therapeutic value of the preparation."

From a summary of the physiological experiments published by Professor Marshall it is clear that while pilocarpine and isopilocarpine produce similar effects on the secretory activity of the sweat and salivary glands the former is by far the more powerful.

---

[1] According to a later research by Jowett, these two alkaloids are probably stereoisomerides.

Isopilocarpine acts like a weak pilocarpine. Pilocarpidine acts like isopilocarpine, but is much weaker. The inference to be drawn from Jowett's chemical investigation and Marshall's physiological experiments is that the preparations of jaborandi should be assayed for pilocarpine and not for total alkaloid, and, further, that inasmuch as pilocarpine possesses acid properties the fixed alkalies should not be used in association with "shake-out solvents." Jowett has given a method by which pilocarpine can be separated from a mixture of isopilocarpine, and pilocarpidine, but no process known to me has been published which is capable of determining within 5 per cent. the amount of pilocarpine present in a preparation of jaborandi.

STRAMONIUM.

It has been suggested that the tincture of stramonium leaf and the extract of stramonium seed should be standardized. As the mixed alkaloids in stramonium are understood to be the same as those contained in belladonna, there seems to be no good reason why a process should not be given in the Pharmacopœia for the assay of these preparations. In this connexion I may be permitted to state that in my judgment the time has arrived when the mixed alkaloids of stramonium might with advantage be subjected to a re-examination as complete as has taken place in the case of henbane.[1]

STROPHANTHUS.

That strophanthus is a drug of considerable value in heart affections is generally acknowledged, and that the tincture, the form in which its remedial properties are exhibited shows an enormous variation in strength is common knowledge to medical men and to pharmacists. If, therefore, a process could be devised for assaying the tincture so that it could always be depended upon to contain a definite proportion of therapeutically active constituent it would prove of inestimable value. There can be little doubt that its usefulness as a medicine is due to the glucosidal principle first isolated by Fraser from *Strophanthus Kombé*, and designated by him strophanthin. Different species of strophanthus appear to yield similar glucosides that pass under the name of strophanthin, pseudo-strophanthin, and ouabain respectively, and that are reputed to vary in their degree of toxicity, chemical constitution, and physical characters. To add to the confusion, the seeds that come into the market are the product of not a single, but different, species of *Strophanthus*, and they resemble each other so closely that when mixed they cannot be distinguished macroscopically. What is required is unmixed mature seeds from a species which yields uniformly active crystalline strophanthin. That requirement, according to Gilg, Thoms, and Shedel, appears to be met by the use of the seeds of *Strophanthus gratas*, which "can be distinguished from all other known African species by the eye alone." From this seed Thoms has extracted a crystalline strophanthin which, after a searching examination, he has shown to be identical with Arnaud's ouabain.

---

[1] I am pleased to observe that Professor Ernst Schmidt of Marburg is now occupied on this work, and in a preliminary announcement states that the only mydriatic alkaloid in *Datura stramonium* is hyoscyamine.—*Arch. der Pharmazie*, 1905, 306.

THE AIM OF STANDARDIZATION.

A few pointed observations reflecting my personal opinion on certain aspects of the question of standardization may not, I trust, be considered inappropriate with which to conclude my address. In my estimation the aim should be to produce preparations that will represent the sum total of therapeutic activity of the drugs operated upon, except in cases where it is desired to obtain the medicinal effects of certain definite principles the physiological action of which is indisputable. As an illustration a preparation of opium may be cited where the presence of narcotine may be considered objectionable. Further, in respect of a given preparation it must be required of the pharmacist to devise suitable processes not only for the estimation of the chief medicinal constituent, but as far as possible the several medicinal constituents and the proportion in which they are present. I would go even further, and say that in the near future it may be necessary to determine certain principles hitherto disregarded which modify the therapeutic activity of the drug. The pharmacologist may be depended upon to point the way, and, despite the heavy tax this call for fuller investigation will put upon the resources of the pharmacist, I am encouraged to believe he will prove equal to the demand. Without reflecting on modern methods of standardization, which have undoubtedly met with general acceptance, I cannot suppress the conviction that their tendency is not free from a suspicion of narrowness. The besetting temptation consists in a disposition to restrict the medicinal properties of a drug to a potent principle, the therapeutics of which are universally recognized by clinicians, and, acting on this assumption, to proceed to produce a preparation, and to standardize it on the basis of the particular principle, and with little or no regard to other constituents that may, directly or indirectly, be of value. For instance, according to present-day knowledge, the chief active principle of the three drugs, belladonna, scopola, and henbane is hyoscyamine. If a tincture of each be prepared so as to contain the same percentage of alkaloid or alkaloidal content, will it be seriously contended that, therapeutically considered the three are interchangeable, and, therefore it is a matter of indifference which of them is selected for use? If the physician finds it a distinct advantage to administer the belladonna tincture in one case and the henbane in another, surely it is because he is satisfied that the two preparations do not produce identical results. May not this be taken as *primâ-facie* evidence that there are in the tinctures constituents present other than hyoscyamine or alkaloidal content that claim to be reckoned with?

The statement has been made, and repeated with unimportant variations, that if standardized drugs were used for making the corresponding preparations there would be no necessity for standardizing the final products.

That opium in coarse powder containing 10 per cent. of morphine is used for making the tincture is evidenced by the fact that it is in demand for that purpose. Whether it is customary to determine the morphine percentage in the finished product, or to rely upon its being correct, I am unable to say. In the absence of accompanying results, verifying the accuracy of the statement referred to, I desire to utter a word of caution to those who may deem it sufficient to make their galenicals conscientiously from standardized drugs without introducing the check, provided in each case, for determining their strength.

Experiments made, notably with cinchona bark and opium, have convinced me that, except when the same preparation is made from the same sample and under precisely the same conditions, the resultant product falls outside the limit of standard strength. Moreover, it is advisable that standardized preparations when made and passed into stock should be of the maximum strength, so as to allow of any reduction by precipi-

tation during storage. A series of experiments made with different specimens of the various standardized drugs might show that by following the official process a certain definite proportion of alkaloid is always extracted, but, until this has been proved beyond dispute, it is certainly unwise to rely on drugs of standard strength for the preparation of galenicals unless the final product is assayed.

While it is an acknowledged fact that definite vegetable principles are in growing demand, yet, on the other hand, there is no perceptible decline in the use of preparations of drugs; those that are standardized being the most favoured. My belief is that the extractive form of galenicals, both solid and liquid, will be used increasingly by the medical profession if pharmacists take pains to equip themselves for the successful investigation of problems connected with the chemistry of drugs. Pharmacy will continue to be largely what the pharmacist qualifies himself to make it.

OBITUARY.

Of those of our fellow-workers who during the year have passed to "where beyond these voices there is peace," it will not be considered invidious if two be singled out for a brief reference. Dr. Albert B. Prescott was enrolled among us as an honorary member. Chief of the offices he filled during a long and useful life were those of Dean of the School of Pharmacy of the University of Michigan, President of the American Pharmaceutical Association, and President of the American Association for the Advancement of Science. His many years of fruitful service on the Committee of Revision of the United States Pharmacopœia, and his numerous and valuable investigations in connexion with the production of successive editions of the volume, would alone establish his claim to front rank among the pharmacists of his generation. He will long be remembered for his researches on the chemistry of drugs, especially in relation to the isolation and purification of vegetable alkaloids. He was a high-souled man, an able investigator, a diligent worker, a keen observer, and a generous contributor to pharmaceutical and chemical literature. The words of fraternal greeting he addressed to us at our annual gathering four years ago still linger gratefully in our memory.

Professor Charles R. C. Tichborne was a man variously distinguished, and possessed of gifts that would have won for him success in other walks of life equal to that he attained in pharmacy. He was a licentiate of the Royal College of Surgeons, Ireland, a member of the General Medical Council, an Examiner to Dublin University, a public analyst, and the recipient of many honours, home and foreign. Three times he served the Conference as a Vice-President, and for five years he filled the high office of President of the Pharmaceutical Society of Ireland. For more than forty years he was director of the laboratories of the Apothecaries' Hall, Dublin, a sphere that provided the opportunity for research, of which he took full advantage. His papers read before the Conference, and his other scientific contributions, were many and important. He was an accomplished pharmacist, a competent chemist, a successful teacher, a capable examiner, a hard worker, and through all his work ran the element of thoroughness.

A study of the individual researches of these men has forcibly impressed me with the thought that they were distinctly of an order that the Conference exists to promote. May we not appropriately remind ourselves that a bare recital of their good work does not suffice for the discharge of our obligation to them, that a large balance of indebtedness still remains, and that we shall most acceptably honour their memory by prosecuting the tasks assigned to us with the same earnest purpose, scrupulous care, and devotion to duty that characterized them?

Dr. JOHN ATTFIELD, as the senior in the past-Presidentship of the Conference, moved that a hearty vote of thanks be accorded to the President for his extremely valuable and most practical address. It would have interested greatly the pharmacists and their ladies then present, though it might not be quite so directly interesting to the public. He could support the President respecting the importance of the subject of his address, not only to pharmacists and the medical profession, but to the public generally, for that medicines should have a fixity of potency so far as human agency could ensure it was a matter of life interest to every member of the public in this country and in other countries. He had no doubt that when Mr. Naylor's address was read by those interested in such matters a very large number of his suggestions would be adopted, and his criticisms would certainly be taken advantage of in future issues of the British Pharmacopœia, in the preparation of which pharmacists are now more directly represented than when he (the speaker) became its Editor. In regard to the processes alluded to by the President in the Pharmacopœia as published seven years ago, he might say that they were mainly the production of the pharmacists of that day; and from what had been said by the President they might be quite sure that those working upon the next issue of the British Pharmacopœia would take advantage of what had been stated. For it must be recognized—and the President's address would enable it to be more recognized than ever—that whereas authoritative works like the pharmacopœias of Europe and America have up till comparatively recent years been content with prescribing genuine raw drugs and preparations of them which were made from a definite proportion of those drugs; that such a condition of remedial agents was passing away, had largely passed away, and, in future, preparations having definite principles and definite percentages of those principles would be used instead by medical men—there would, in short, be fixity of strength, or, in other words, special standardization. The President had brought some of the aspects of the question before the meeting and he had warned them that, like successful navigators or mountaineers or travellers in unknown regions, not only must they have published guides in producing medicinal substances, but like the persons referred to, they must be certain as to where they were at the moment, otherwise the pharmaceutical chart and compass would be useless to them. He moved that the thanks of the Conference be given to the President for his address.

Mr. S. R. Atkins seconded the motion. He referred to the meeting at Brighton thirty-three years ago, and said that, on looking back to the meeting of 1872, he found that scarcely a man who took a prominent part, except his friend, Dr. Attfield, was now living. It appealed to him very powerfully when he thought of the record of those men of the serious blank which their departure had created. He did not wish to mention names—that would be invidious, and the list would be a long one—he would mention three names, only, Groves, Schacht, and Reynolds, which would confirm the truth of his remark. He did not mean to infer that the olden times were better than the present—there were men on the platform and in the body of the hall who were quite able and were actually doing the work to-day, as efficiently and successfully as the past generation. Still, they ought not to forget the men who had honoured pharmacy. Mr.

Atkins then referred to the high esteem in which he held Mr. Naylor, and the great services he had rendered to the Conference, not the least important service being his latest contribution to pharmaceutical literature.

The vote of thanks was then put, and carried with acclamation.

The PRESIDENT, in reply, said as one who was not a politician or an educationist in the ranks of pharmacy, and who had not the great advantage that most present had of being a retail chemist, but one who had simply spent the greater part of his working life within the confines of an analytical laboratory, and had been engaged in the manufacture of galenicals, he had found it a matter of some difficulty to make a choice of a subject which would be sufficiently appropriate to base an address upon, and it was a great relief to him to listen to the kind words which had been spoken by the mover and seconder of the vote of thanks, and the response which had been given by those present. He could not sit down without saying that it was to him that morning a peculiar pleasure that the vote of thanks should have been presented by Dr. Attfield, for under Dr. Attfield's tuition many years ago he received his systematic training in chemistry, and he might say that Dr Attfield had always been to him a splendid friend.

LETTERS OF APOLOGY FOR ABSENCE.

Mr. E. SAVILLE PECK, Hon Secretary, said letters and telegrams expressing regret at non-attendance had been received from Messrs. Charles Umney, M. Carteighe, N. H. Martin, E. M. Holmes, Walter Hills, Thomas Tyrer, Robert Wright, Peter MacEwan, J. F. Tocher, George Lunan, W. L. Currie, Fred. Reynolds, William Kirkby and A. R. Fox. Mr. Wardleworth wrote from Montreal, and enclosed a photograph of a crystal of glycerin. Dr. Donald McAlister, President of the General Medical Council, and Chairman of the Pharmacopœia Committee, wrote expressing regret at inability to be present, but stating that he should read the report of the proceedings with great interest. Mr. David Hooper, of Calcutta, had also written, sending good wishes for a successful meeting.

The President said he was sure everyone present would regret the cause of Mr. Carteighe's absence; and, with their permission, he would like to read his letter, which was as follows :—

"MY DEAR MR. PRESIDENT,—

"I have this day only, on my return from abroad, received your gracious letter of July 13. I beg you to convey my warmest thanks to your colleagues for their sympathetic affection, and thank you yourself especially for the graceful manner in which you have expressed the feelings of the Committee. You will not expect to see me at Brighton this week. I should have been glad to have been able to tell our Brighton friends how keenly and with what pleasure I recall the good time we had at the last meeting, somewhere about thirty-three years ago. Good luck to you all! I hope your Presidential career will increase your well-earned reputation, and that you will be well supported by the leading spirits in the world of pharmacy.

"Believe me,
"Yours sincerely,
"M. CARTEIGHE."

RECEPTION OF DELEGATES.

Mr. EDMUND WHITE, Hon. Secretary, read the list of delegates as printed below: -

Pharmaceutical Society of Great Britain.—Mr. R. A. Robinson (President), Mr. J. Rymer Young (Vice President), Messrs. Atkins, Carteighe, Cooper, Cross, Currie, Gibson, Gifford, Hagon, Harrington, Hobbs, Newsholme, Park, Symes, and Wootton.

Pharmaceutical Society of Great Britain (North British Branch).—Mr. D. B. Dott (Chairman), Mr. J. P. Gilmour (Vice-Chairman), Messrs. Cowie, Fisher, Mitchell, and Wilson.

Pharmaceutical Society of Ireland.—Mr. W. F. Wells (President, Dr. J. A. Walsh (Vice-President), Messrs. Beggs and Watson.

Chemists' and Druggists' Society of Ireland.—Mr. W. J. Gibson.

Aberdeen Pharmaceutical Association.—Messrs. W. Giles, Patterson, and Kaye.

Bradford and District Chemists' Association.—Mr. Arthur Hanson.

Midland Pharmaceutical Association.—Mr. A. W. Gerrard (President), Messrs. Alcock, Poole, Smith, and Thompson.

Bath Pharmaceutical Association.—Mr. W. J. Hallett.

Brighton Association of Pharmacy.—Mr. W. H. Gibson (President), Messrs. Ashton, Blamey, Cook, Costerton, Cripps, Franklin, J. Padwick, Plowright, Robinson, W. W. Savage, Yates, Williamson, J. K. Padwick, and G. B. Savage.

Bristol and District Pharmaceutical Association.—Messrs. J. W. White, Kirby, Sleight, and Boorne.

Bournemouth Pharmaceutical Association.—Messrs. F. Rose and Pars.

Cambridge Pharmaceutical Association.—Messrs. Cook and Peck.

Cheltenham and District Chemists' Association.—Messrs. W. Barron and J. A. Thomas.

Dover Chemists' Association.—Mr. R. M. Ewell.

Exeter Association of Chemists and Druggists.—Messrs. E. F. Stone (President), H. Wippell Gadd, Lake, and Vinden.

Edinburgh Chemists', Assistants', and Apprentices' Association.—Miss Glass, Messrs. Cowie, Duncan, and Rutherford Hill.

Forfarshire and District Chemists' Association.—Messrs. Anderson, Ford, and Russell.

Glasgow and West of Scotland Pharmaceutical Association.—Messrs. Brodie, Gilmour, and Sutherland.

Hull Chemists' Association.—Mr. C. B. Bell.

North Kent and District Chemists' Association.—Messrs. Goldthorpe (President), Cook, and Feaver Clarke.

Leeds Chemists' Association.—Messrs. Beacock, Branson, Castlerow, Preston, Pilkington, Sargeant, and G. W. Worfolk.

Liverpool Chemists' Association.—Messrs. Edward Evans, J. Herbert Evans, Marsden, Symes, and Wyatt.

London Chemists' Association.—Messrs. Holding, Idris, Glyn-Jones, R. H. Jones, Leo Atkinson, Pentney, Pickering, Truman, and J. C. Umney.

London Chemists' Assistants' Association.—Messrs. Arrowsmith, Garsed, and Presant.

London Western Chemists' Association.—Mr. F. A. Rogers (President), Messrs. Bowen, Barrett, Cofman, A. Cooper, Harrington, and Mather.

Manchester Pharmaceutical Association.—Mr. G. S. Woolley (President), Messrs. H. Kemp and Wm. Kirkby (Vice-Presidents), and Messrs. Grier, Kidd, Ringer, A. J. Pidd, Wild, and J. R. Young.

Newcastle-on-Tyne and District Chemists' Association.—Messrs. Maltby Clague, Foggan, and Gilderdale.

Nottingham and Notts Pharmaceutical Association.—Messrs. Eberlin, Middleton, and Parkes.

Oxford and District Chemists' Association.—Messrs. Clayton and Druce.

Plymouth, Devonport, Stonehouse and District Chemists' Association.—Messrs. Barge and Park.

Sheffield Pharmaceutical and Chemical Society.—Mr. A. R. Fox (President), Messrs. Antcliffe, Carr, Dixon, Pater, Jackson, Squire, Williams, and Newsholme.

REPORT OF THE EXECUTIVE COMMITTEE.

Mr. PECK, Hon Secretary, presented the annual report as follows :—

" Your Committee has pleasure in presenting the forty-second annual report of the work of the Conference carried out during the past year.

" Sixty-one new members have been elected, whilst thirteen have resigned and nineteen have been removed by death. The Register now contains the names of 1,038 members, of whom, we regret to report that 725 only have remitted their subscriptions for the current year.

" Of those removed by death special mention must be made of Professor Prescott, of Michigan University, Ann Arbor, U. S. A., an honorary member of the Conference ; Professor Tichborne, of Dublin, a frequent contributor of papers ; Mr. J Lloyd Bullock, one of our oldest members, and Mr. H. Mathews, of Oxford, a member of long standing, and Hon. Local Secretary when the Conference met at Oxford.

" The arrangement with the Pharmaceutical Society for the taking over of the work of the Formulary Committee sanctioned by the annual general meeting at Sheffield has been completed.

" During the year, with the view of increasing the membership of the Conference, efforts have been made to secure the appointment of Local Corresponding Secretaries in those districts hitherto unrepresented, and we are pleased to state that as a result forty-three additional appointments have been made, and your Committee have no doubt that the eighty Local Corresponding Secretaries now holding office will succeed in arousing an increased interest in the proceedings of the Conference.

" The thanks of the Conference are due to these gentlemen for the readiness with which they have responded to the claims made upon their services, which include :—

(*a*) To bring under the notice of pharmacists, principals, and their assistants in their districts who are unassociated with the Conference the advantage of membership with it, and by personal effort to induce them to join.

(*b*) To assist in stimulating research by asking pharmacists who have the time, ability, and disposition to contribute from time to time a paper or useful note to the annual meetings.

(*c*) To endeavour to induce defaulters to continue their membership.

(*d*) To take generally a watchful and sympathetic interest in the affairs of the Conference.

"At the meeting held on Wednesday, July 12, 1905, your Committee appointed a Research Sub-Committee to carry out Section II, Article I, of the Constitution. The duties of the Sub-Committee will be :—

1. To keep the Research List revised by deciding what questions require investigation.
2. To allot problems to individual members to work out.
3. To advise the Executive in making grants towards the expenses of certain pieces of research work out of the funds available for this purpose.
4. To regulate the supply of papers for the yearly meetings of the Conference.

"The following members of the Executive have been elected to serve upon this Sub-Committee :—The President (Mr. W. A. H. Naylor), Mr. J. C. Umney, Professor Greenish, Mr. E. M. Holmes, Mr. F. C. J. Bird, Mr. H. Wippell Gadd, Mr. F. Ransom, and Mr. E. S. Peck.

"This Sub-Committee will be glad to receive suggestions from members upon matters of research.

"The General Index of the *Year-Books of Pharmacy* from 1886 to 1903 inclusive is now completed. It has been compiled by the Editor—Mr. J. O. Braithwaite, with his characteristic care and zeal. As announced last year, the price of the book has been fixed at 3*s*. 6*d*., post free, and for those who desire also a copy of the previous Index—1864 to 1885—the two volumes will be supplied at 5*s*. 6*d*. post free, until the stock is exhausted.

"Your Committee feels sure that the members of the Conference will heartily welcome this work, which has been produced at considerable labour and expense, and will show their appreciation by taking an early opportunity of acquiring copies.

"In conclusion, your Committee—to quote the words of the

Annual Report of 1872—the occasion of the last visit to Brighton —congratulates the Conference on the continued success of the annual meetings—a success which they attribute in a large measure to the excellent arrangements made by the members of the Local Committees entertaining the Conference year after year."

FINANCIAL STATEMENT.

Mr. J. C. **UMNEY**, Treasurer, in presenting the financial statement, said it was more satisfactory than for many years. He pointed out that none of this year's subscriptions were included in the statement, as had been done sometimes when subscriptions were received before June 30. He regretted that there were about 300 subscriptions which had not been paid; had they been paid there would have been a good balance in hand. He was sorry that the auditors, Mr. J. W. Bowen and W. Prior Robinson, were not present, but the thanks of the Conference were due to them, and they were glad that Mr. Bowen, whose health had not been satisfactory, was now better.

Mr. **DRUCE** moved that the report of the Executive and the financial statement be adopted. He mentioned that it was his privilege to join the ranks of the British Pharmaceutical Conference thirty-three years ago at the Brighton meeting. He remembered that during the discussion on Dr. Attfield's paper, Professor Michael Foster entered the Royal Pavilion, and added a word or two about "cram." With regard to the report and financial statement, he would like to suggest that subscriptions, say of one or two guineas in advance might be asked for, which should cover 3 or 6 years' membership: it might help to decrease the number of members whose subscriptions remain unpaid. He was very pleased that the General Index to the *Year-Book* was now complete, and he hoped every member of the Conference would obtain a copy, which would be extremely useful to them.

Mr. G. F. **MERSON** seconded the motion, and expressed his satisfaction that the General Index would soon be available.

Mr. F. H. **LESCHER**, as an old member of the Conference, supported the motion, and said how gratified he was to see Mr. Naylor in the Presidential chair.

Mr. H. E. **BOORNE** suggested in regard to unpaid subscriptions that a list of subscribers should be supplied to local Corresponding Secretaries with the names of those who had not paid indicated.

Mr. **PECK** thanked Mr. Boorne for the suggestion, which, how-

FINANCIAL STATEMENT FOR THE YEAR ENDED JUNE 30, 1905.

The Hon. Treasurer in Account with the British Pharmaceutical Conference.

1904	Dr.	£	s.	d.	£	s.	d.
July 1.	To assets forward from last year—						
	Cash at Bank	25	17	0			
	„ in Secretary's hands	10	11	0			
	„ in Hon. Treasurer's hands	3	15	0			
					40	3	0
1905.							
July 1.	To Members' Subscriptions	361	5	6			
	„ Purchase of Formulary by Pharm. Society	73	10	0			
					434	15	6
	„ Sales of *Year-Book* by Publishers	10	13	4			
	„ Sales of *Year-Book* by Secretary	1	0	0			
					11	13	4
	„ Advertisements in *Year-Book*	79	7	0			
	„ Amount received for Index	2	19	0			
	„ Sale of Formulary	1	13	9			
					83	19	9
	„ Liabilities on open Accounts—						
	Butler & Tanner	165	12	5			
	McCorquodale and Co.	3	15	6			
	Due to Assistant Secretary for Salary and Rent for One Quarter ending June 30	13	15	0			
					183	2	11
	„ Bell and Hills Fund				26	6	4
					£780	0	10

The Bell and Hills Fund.

1904.		£	s.	d.	£	s.	d.
July 1.	To Balance from last year	27	8	1			
	„ One Year's Dividend on Consols	8	11	0			
					35	19	1
Oct.	By Kimpton's Account for Books				9	12	9
					26	6	4

Assets—
In Account with British Pharmaceutical Conference.
£360 2½ per cent. Consolidated Stock.

The British Pharmaceutical Conference Research Fund.

1904.		£	s.	d.
July 1.	To Balance	38	5	0

1904. July 1. Cr.	£	s.	d.	£	s.	d.
By Bell and Hills Fund, last year				27	8	1
1905.						
By Expenses of *Year-Book* 1904—						
Printing, Publishing, and Binding	235	12	5			
Posting and Distributing	19	15	6			
Advertising £1 8*s*., Publisher's charges, 1*s*. . .	1	9	0			
Commission on advertisements	19	16	9			
				276	13	8
,, Editor's Salary				100	0	0
,, Publisher's Commission on Sale of Formulary .				0	3	5
,, Sundry Expenses—						
Assistant Secretary—Annual General Meeting .	10	0	0			
Assistant Secretary—Salary for One Year to date	45	0	0			
,, Rent of Office	10	0	0			
,, Room at Royal Victoria Hotel, Sheffield . .	0	7	6			
,, Postages, £12; Editor, 13*s*. 8*d*.	12	13	8			
				78	1	2
,, Printing and Stationery—						
McCorquodale & Co.	4	13	0			
Hall & Son, Cambridge	0	10	6			
Editor	0	9	2			
				5	12	8
,, Petty Cash				5	15	3
,, Foreign Journals for Editor				5	2	0
,, Bank Charges				0	1	6
,, Liabilities of Last Year, since paid						
Butler & Tanner	171	13	5			
McCorquodale & Co.	5	13	0			
Assistant Secretary's Salary	13	15	0			
				191	1	5
,, Cash in Secretary's hands				3	15	9
,, Balance at Bank				86	5	11
				£780	0	10

Examined and found correct:—

J. W. Bowen } *Auditors.*
W. P. Robinson }

ever, had been forestalled at the last meeting of the Executive, when it was resolved that what he suggested should be done.

Mr. HARRY KEMP asked if members whose subscriptions were unpaid received copies of the *Year-Book*.

The PRESIDENT: They only receive the *Year-Book* when their subscriptions are paid.

Mr. ALCOCK suggested that when Local Corresponding Secretaries called upon members for their subscriptions a copy of the *Year-Book* should be taken round, and he thought that they would be satisfied that the book alone was well worth the subscription.

The PRESIDENT said his experience confirmed what had been said as to the usefulness of the General Index. The *Year-Book of Pharmacy* was becoming increasingly useful to Pharmacists, and there was now more practical pharmacy in it than there used to be.

Dr. ATTFIELD suggested that the name of the compiler of the General Index, Mr. J. O. Braithwaite, be printed on the title-page, and that the thanks of the Conference should be given to him for his great labour. The compilation of the General Index had involved an enormous amount of work, which was not adequately represented by any small fee Mr. Braithwaite might receive from the Conference for the technological and literary labour obvious to every one using the book.

The report and financial statement were adopted, and the thanks of the Conference were given to Mr. Braithwaite for his work in connexion with the General Index.

A VISITOR FROM THE CAPE.

The PRESIDENT said he saw before him a friend from the Cape—Mr. Mager, of Queenstown, South Africa, who was present at the meeting of the Conference at Nottingham some years ago. He invited Mr. Mager to come upon the platform, and, if he felt so disposed, to say a few words.

Mr. MAGER said he felt very much complimented on being asked to take a seat on the platform beside the President. He had been a member of the Conference for a great many years. He had always taken the deepest interest in the British Pharmaceutical Conference and in the pharmaceutical work done in England, and in the colony from which he came. He now had the honour to belong to the South African Pharmacy Board which was known to a great many present, as a small board whose duty it is to control matters of pharmacy in regard to government, and as an examining body. He was referring to the old Cape Colony and not to the Transvaal or Orange River Colony, which had come so much before the public recently. He was not speaking that morning as a delegate, but simply in response to the honour which had been conferred upon him.

The reading of papers communicated to the Conference was then proceeded with.

THE COMPOSITION OF DENTIFRICES AS AFFECTED BY RECENT INVESTIGATIONS IN DENTAL SCIENCE.

By Stanley Read, L.D.S.E.

As a foreword I desire to make it plain that I do not pretend to any knowledge of drugs, therefore I can only deal with this subject in a general way. From the textbooks I have taken as examples of tooth powder three prescriptions, (1) an English, (2) an American, and (3) a German one :—

(1.)	℞	Saponis hisp	ʒii.
		Pulv. iridis	ʒiii.
		Ossis sepiæ	ʒii.
		Cretæ præcip. Mag. carb. pond.	aa ℥ii.
		Ol. eucalypti	♏viii.
		Otto rosæ	♏viii.
(2.)	℞	Cretæ præparatæ	℥iv.
		Pulv. radicis iridis	℥iv.
		Pulv. cinnamon.	ʒiv.
		Sodii carbonatis exsic.	ʒss.
		Pulv. sacchari albi	℥i.
		Olei limonis	gtt. xv.
		Olei rosæ	gtt. ii.
3.)	℞	Precipitated carbonate of calcium	℥iii¾.
		Cinchona bark	ʒxv.
		Prepared oyster shell	ʒxv.
		Powdered myrrh	ʒvii½.
		Powdered cloves	ʒiii¾.
		Oil of cinnamon	gtt. x. to xv.

As every one knows, tooth powders are all somewhat like the above. Now, the task I have before me is to show how the latest dental knowledge bears on such dentifrices.

Dr. Miller, of Berlin, undertook a long series of experiments upon himself and other people to discover the reason why some people are immune to dental caries while others are particularly susceptible to it, and he came to the conclusion that there is a protective flora of the mouth, as is found in all cavities of the human body, which are lined with mucous membrane, and that the crux of the question is the survival of the fittest ; if the physical condition of the mouth is as it should be, this protective flora overcomes the bacterial intruders, but unless the beneficent bacteria are in sufficient numbers they succumb to the germs that cause decay. This would seem to be the only possible conclusion that one could come to when one thinks of the unclean mouths one sees with no decay, or hardly any, and the scrupulously clean mouths with nearly every tooth decayed.

Then quite recently it was stated in one of our journals that there had been discovered in the saliva a substance belonging to the group of enzymes having the power of setting free acids from certain compounds, and it is assumed that this new ferment is a leading agent in the destruction of the teeth. These two statements taken in conjunction must have a great effect on the constitution of a proper dentifrice. First, they render it necessary to remove the antiseptic agent from our prescription. This at first sight sounds heretical in these days of germicides, but on consideration it will be recognized that, as far as we know at present, any drug that will destroy the bacteria of decay will also destroy those which protect the mouth. Secondly, they reduce all dentifrices to the position of alkaline polishing agents. Thirdly, they seem to prove that all liquid dentrifices are inefficient, if not actually harmful, for they have none of the polishing qualities that are absolutely necessary in a dentifrice, and as they all claim to be disinfectants, or at least antiseptics, they may do harm. So the daily use of an antiseptic mouthwash, unless prescribed for a disease of the mucous membrane, would appear to do more harm than good ; for the antiseptic effect cannot last more than an hour, or at the most until the next meal, and owing to its having probably destroyed the flora of the mouth it leaves the oral cavity unguarded for the rest of the twenty-four hours against the entry of any bacteria that come along.

Therefore, there seems to be only one condition of the mouth in which a dentifrice may exercise some protective power over the teeth : that of acidity. But it is not possible by the use of tooth powder even three times a day to keep the mouth entirely alkaline or neutral, so that we must end by regarding tooth powders, even the best of them, as agents for removing the stains from the teeth merely for æsthetic reasons.

The last prescription I gave for tooth powder was :—

℞ Sapon hisp. . .	ʒj. :	to break up any greasy matter on the teeth.
Cretæ precip. .	℥j. :	the usual polishing agent.
Ossis sepiæ . .	ʒj. :	in the case of poor teeth or for a woman I should not add this, but this man had hard strong teeth and smoked many cigarettes
Mag. carb. pond.	℥j. :	antacid.
Otto rosæ . .	♏j.	

Mr. Upsher Smith said that there seemed to be much common sense in the author's suggestions, and they were likely to be largely followed in the future. He wished to suggest that the peroxides might be useful as cleansing agents ; in particular magnesium peroxide might be used to partly replace the magnesium carbonate.

Mr. Stanley Read replied that, as he said in his paper, he had no knowledge of drugs, and that he left their choice to those with better knowledge of their properties. He did not claim that his prescription was the best, but merely gave it as a suggestion of the lines to be followed.

THE BIO-CHEMICAL STANDARDIZATION OF DRUGS.

By W. E. Dixon, M.D.(Lond.), M.A.(Cantab).

Until comparatively recent times plants have been employed in the preparation of medicines without regard to variations in their activity. These variations may have little significance, in the bitters and group of drugs containing tannins, or it may be of the greatest importance, as in aconite and nux vomica. The British Pharmacopœia has directed, therefore, that certain vegetable preparations, especially such as contain alkaloids, shall be subjected to a chemical assay. There are certain very important drugs which at the present time it is impossible to assay satisfactorily by any chemical means. Some of these, it is true, appear to have a fairly constant action, but others vary in activity within the widest limits. It is at least as important that these should be properly standardized, as many other drugs often of a less poisonous nature which are assayed chemically. I therefore suggest that a fixed and definite bio-chemical standardization should be adopted for these remedies as far as possible.

The chemist already employs animals as a test for certain drugs.

For example, the Pharmacopœia suggests as one of the tests for atropine its instillation into the pupil. Or again, one of the most sensitive methods for the recognition of small quantities of aconitine is to place a little of the solution on the tongue, when there is a characteristic tingling followed by numbness. The standardization of the various sera is only possible by experiments on animals. It is first necessary to prepare a standard toxin, which is done by injecting guinea-pigs subcutaneously with different quantities of the poison and determining the minimal lethal dose. This is spoken of as the unit, and with this all degrees of toxicity and antitoxicity must be compared. So that bio-chemical testing is not so unusual as it may appear at first sight, and in many cases it gives us a standard for preparations which at present it is impossible to assay chemically, and which is sufficiently accurate for therapeutic purposes.

The drugs which especially require standardizing are the members of the digitalis series, ergot, and Indian hemp. There are many others of less importance, such as filix-mas, which can be assayed by this method, and still others, especially those having purgative action, in which this method of testing is not suitable.

The strength of a preparation from a drug cannot be standardized upon patients (1) on account of the great difficulty of recognizing small effects, and (2) because it involves many experiments, a great loss of time, and, in many cases, is dangerous, so that it is necessary to apply our tests to lower animals. The principal difference in the action of drugs on man and animals occurs in those remedies which attack the central nervous system. Of course, this is what we should expect from our knowledge of the anatomy of the brain. I cannot better make the case clear than by reference to the following table, which shows both the degree of development of the brain in different animals and the amount of cocaine, a drug which directly excites the brain, necessary in the case of each animal to produce convulsions :—

Animal.	Gm. of Brain Per Kilo. of Animal.	Dose of Cocaine Per Kilo. of Animal Necessary to Produce Convulsions.
Rabbit	4	0·18
Guinea-pig	7	0·07
Pigeon	8	0·06
Dog	9	0·02
Ape	18	0·012

But on other tissues this difference is not apparent. If a drug attacks the heart of a man in a certain way it attacks the heart of every mammal in precisely the same way ; or if the attack is upon glands the type of action is constant throughout mammalia. To take one example of this, secretin is a remedy prepared from the duodenum, which increases the flow of pancreatic juice as no other drug will, but secretin prepared from man or dog has precisely the same effect on every vertebrate pancreas throughout the animal kingdom, including that of the frog. The principal objection to this type of experiment is that the reagent, that is, the animal, is too sensitive, so that changes in the conditions under which the experiments are performed may lead to some error. However, if due precautions are taken to keep the conditions of experiment as constant as possible I have found this method of standardization wonderfully accurate.

The drugs which are suitable for standardization by the biochemical method are digitalis, strophanthus, squill. and other drugs belonging to the same group ; ergot, Indian hemp, lobelia, grindelia, conium, and some others.

METHOD OF STANDARDIZATION.

The digitalis group can be assayed in the first place upon frogs. Frogs vary in their conditions very greatly during the year. They are most active and vigorous in the summer, and are least vigorous in the spring ; but in spite of these differences their sensitiveness to the digitalis poison does not vary very much—that is, the animal does not require 50 per cent. more digitalis at one time of the year than at another to kill it ; were such the case this method of standardization would be useless. The frogs should be males, free from all abnormal conditions and about 25 gm. weight. The drug is then standardized by injection into the dorsal lymph sac ; for this purpose the tinctures must be diluted with the same amount of water. Six minims of this diluted solution should kill the frog by stoppage of the heart within an hour. This I propose as a standard unit, and all tinctures of digitalis should bear a label stating how many minims go to the unit. Supposing it is found that 5 minims of a diluted tincture is the maximum lethal dose, then this tincture can be diluted with water to bring it down to the standard. If, however, 8 minims of tincture form the maximum lethal dose, then the label should state that the unit corresponds to 4 minims instead of 3 minims. This does not necessarily mean that a prescription containing digitalis should differ in any way from a present-day prescription, but the quantities prescribed by the physician will refer to standardized tincture. If the chemist's tincture is not standard strength he can by a simple proportion add the necessary amount of his tincture to correspond to that prescribed.

Tincture of strophanthus is invariably more toxic than that of digitalis. In treatises of medicine it is stated that in certain cases of cardiac disease where digitalis fails to give relief, strophanthus may succeed. An explanation of this is (1) that strophanthus preparations are more powerful than those of digitalis; and (2) they are absorbed more quickly into the system. Still, as tincture of strophanthus has the same dosage as that of digitalis, obviously it should have an equal toxicity. It may be standardized in precisely the same way as the former drug. This will generally mean the dilution of the tincture as at present prepared to bring it down to the requisite standard. The last member of this group, tincture of squill, can be assayed also just like digitalis. It is usually a little less toxic than digitalis, but the difference between the two tinctures is not very marked.

This method of assaying can be controlled still more accurately upon rabbits, and, indeed, it is generally advisable that such controls should be performed, but the details of these experiments I defer till later, as well as the standardization of the other preparations of this group.

Ergot is another drug that varies enormously in its activity. Recently I obtained six specimens of the liquid extract from six different sources; two of these were moderately active, two had a very feeble action, and the remaining two either had no action at all, or their effect was so feeble as to be absolutely worthless therapeutically. There is, therefore, a greater necessity for the standardization of preparations of ergot than even for the members of the digitalis series, which rarely vary more than 100 per cent. between the extremes. At the present time the only method of standardization that has been adopted is the injection of the drug into roosters; if the dose is sufficiently large they develop gangrene on the comb and wattles after the necessary interval of time. This method is open to several objections; perhaps the most important being the great difficulty of determining the minimal dose that will produce gangrene. And, further, I do not believe that this gangrene production is in any way proportional to or indicative of the therapeutic action we require when we administer ergot. The gangrene is not due to simple constriction of the vessels, but to a secondary degeneration of the vessels, which results in the complete blocking up of the smaller arterioles. I have found, however, that rise in blood-pressure in mammals is proportional to the effect of ergot upon the uterus. Now this rise is due mainly to the constriction of the vessels, so that if we can measure the increase of blood-pressure under fixed conditions we have a method of standardization at once quick, reliable, and proportional both to the vaso-constriction and the effect on the uterus, which are the two conditions for which the drug is employed in therapeutics. The experiments should be performed on rabbits, conforming as nearly as possible to a standard weight, and anæsthetised with urethane, 1¼ gm. of urethane per kilo. body weight being necessary for complete anæsthesia. By this means we avoid all the disturbing influences of a volatile anæsthetic. The blood-pressure may be taken from the carotid artery, and the drug (liquid extract of ergot) injected into the femoral vein. The fluid should be at body temperature, and the injection should occupy a definite fixed time. Experiments performed in this way I have found to be a sure means of determining to a considerable degree of accuracy the relative activity of different specimens of ergot. The exact amount of ergot necessary to produce the standard rise in blood-pressure I defer to a fuller communication.

Cannabis indica is another plant which varies very greatly in its toxicity. When it is grown in India it develops the power of elaborating an oily substance which is utilized in the growth of its seeds, and which is toxic. If the plant is grown under other climatic conditions a resinous substance is still elaborated but it has lost its narcotic properties. It is, therefore, very evident that if this drug is to be used at all extensively it should be assayed. This cannot be done on animals with the same degree of accuracy as the drugs already mentioned, (1) because the action is on the central nervous system, and (2) because the degree of action must be gauged by the experimenter and cannot be recorded. The tincture should be diluted with an equal volume of water and 10 m. injected subcutaneously into a cat of about 2½ kilos. weight. In an ordinary active sample these animals soon begin to show physical signs of intoxication. The pupils dilate, the reflexes are increased, and the gait becomes exceedingly awkward, the animal rolling from side to side and showing other signs of incoordination. A tincture of average strength produces moderate intoxication, but quite a number of tinctures on the market, even in four times this dosage, produce no effect at all, whilst a few others produce a greater degree of intoxication.

Lobelia can be standardized very accurately by its effect upon blood-pressure and its subsequent paralytic action on certain nerve cells. Lobeline, like many of the so-called "active principles" taken from digitalis, I have found often to be quite inactive.

It may occasionally be necessary to test opium for the presence of excessive amounts of alkaloids other than morphine. It is well known that certain specimens of opium when given to patients produce excitement and increased reflexes. I believe that in these cases a large amount of narcotine is present in the samples, and this makes it unsuitable for medicinal purposes. In such cases the injection of the opium into a frog leads to convulsions very quickly, and affords a test of the usefulness of the specimen.

In conclusion, it is only necessary to point out that pharmacological standardization should only be resorted to when chemical methods are inadequate. In the examples I have given it is the only method available, and if it is essential to assay the various sera it is just as important in ergot, digitalis, and Indian hemp.

The **President** said that all had listened with attention to, and could profit by, the address which Dr. Dixon had delivered. It was evident that if one had to standardize preparations in this way one would have to keep a small menagerie. All must have been confronted with the fact that they had not been able to deal adequately with the drugs referred to. Whether they would be able to apply the bio-chemical method remained to be seen, but it was a gain that they should know what the medical profession required.

Mr. **Lescher** said the reason they welcomed this paper was that it brought them nearer to pure drugs, an end to which they had all worked. In the United States he had seen, in the works of several firms, a menagerie, as the President had said. Wholesalers saw the importance of these standards, and the methods alluded to had much to recommend them. The author had spoken against the use of crude drugs, but crude drugs had a power and use in medicine which often was not the same as that of their active principles.

Mr. **Boorne** said that one remark to which he had taken exception was the suggestion that if a medical man ordered 10 minims of tincture of digitalis and the chemist's tincture was not of the standard strength, that he should use a corresponding quantity. He thought that all tinctures should be of standard strength.

Dr. **Symes** said that he had seen at Liverpool experiments with suprarenal gland on a cat, and it was very interesting to see the rise in blood-pressure, but he wondered whether animals were sufficiently constant in their reaction for standardizing purposes. They also knew as a fact that, in the preparation of sera, the animal became immune to the action, and one could not help thinking that a cat might become immune or perhaps increasedly sensitive, and therefore, before bio-chemical supersede chemical methods, they must be quite sure that the tests themselves " are capable of being standardized." His experience was that the medical profession did not sufficiently encourage the care taken by pharmacists, and that there was a tendency among medical men to repudiate the effects of drugs, and to give less attention to them.

Mr. **Maben** said it was a matter for congratulation that the Conference should have a paper from a man of such eminence as Dr. Dixon. With the drugs Dr. Dixon had mentioned—digitalis, strophanthus, and ergot—the tests were most accurate, animals kept under the same conditions always reacting in the same manner. In the testing of serum the guinea pigs were never used twice, so that they could not become immune. He did not agree with Dr. Dixon that roosters were not good for the testing of ergot; he understood that the hæmostatic, blood-pressure raising, and uterus-contracting effects of ergot were all co-related, and that a drug which would produce gangrene in the comb of a rooster would also contract the uterus.

Mr. **Rutherford Hill** said that the suggestion that physiological standards should be inserted in the Pharmacopœia raised the question of the danger of causing a large amount of needless suffering to animals. There ought to be a national institution for standardizing preparations, to which all would have to be submitted for a certificate before being recognized as of pharmacopœial quality. They would thus eliminate to a great extent the personal equation in applying the tests.

Mr. **William Mair** pointed out that the new U.S.P. had expressly avoided all physiological tests, notwithstanding that there are not the same restrictions upon vivisection as there are in this country.

Mr. H. **Finnemore** asked if Dr. Dixon could say whether commercial ergotinine citrate was uniform in action.

Dr. **Attfield** asked what should be the attitude of pharmacists to bio-chemistry. It would be of importance to the average pharmacist to learn this from such an authority as Dr. Dixon. Was it contemplated that the chemist and druggist should become a bio-chemist ?

Mr. J. C. **Umney** pointed out that there was a large amount of popular prejudice against physiological tests.

Mr. R. A. **Cripps** asked if Dr. Dixon had any information as to the method of preparation of the extracts of ergot he used, as these are often made by non-official methods.

Dr. **Dixon**, in replying, said he was very pleased at the reception of his paper. He did not propose that the chemist should perform these tests himself, as they must be done by men having special training. It had been said in the discussion that he proposed to substitute bio-chemical for chemical methods, but that was not so ; he had only proposed to use bio-chemical methods where there were no good chemical methods. Dr. Symes was under a misunderstanding ; the action of adrenalin was the same on men and animals. The gangrene produced in the combs of roosters was *not* proportional to the action on the uterus or to its power of constricting the blood-vessels, and the measurement of rise of blood-pressure was the best test. As for the attitude of the pharmacist, it should always be in favour of progression. If the compilers of the United States Pharmacopœia did not include the best tests at present available, that was no good precedent for the compilers of the British Pharmacopœia. The best physiologists in America have pressed the great advantage of this method on the compilers of the Pharmacopœia. He hoped he would be able to give a further paper on this subject in another year.

STANDARDIZATION IN THE NEW U.S.P.

By Thomas Maben, F.C.S.

The eighth decennial revision of the United States Pharmacopœia has just been issued and the members of the British

Pharmaceutical Conference will no doubt be interested in the changes that have been made in official American pharmacy. These changes are both numerous and important. It is not my intention to go into a detailed consideration of the various alterations, but simply to confine myself to some account of the fairly extensive application of the principle of standardization, as illustrated in the series of standards adopted for alkaloidal drugs and for the chief galenicals made from them. I do not propose to deal with the various processes for the estimation of alkaloids, leaving these to experts in that branch of pharmacy, nor to the essential oils, which are to be discussed by well-known authorities.

The question of standardization has been often before the British Pharmaceutical Conference. We might, indeed, say it has reached its majority, for it is exactly twenty-one years since, at Hastings, in 1884, the first full-dress debate took place on the subject. In that debate many honoured men took part, some of whom, alas ! are no longer with us, amongst them being the President (Mr. Williams), Professor Redwood, Mr. Schacht, and Mr. Martindale. If we except opium, there was in those days very little official standardization either in this country or America, the only other approach to the principle being the requirement in the 1880 U.S.P. that tinctures of ignatia and nux vomica should contain extractive matter to the extent of 1 per cent. and 2 per cent. respectively. The introduction, shortly thereafter, of an unofficial alkaloidal standard for tincture of nux vomica—namely, 0·3 per cent of total alkaloids, without reference to the extractive matter, led to a case being brought before the Courts, and so recently as 1891 it was decided by a legal judgment that tincture of nux vomica must contain 2 per cent. of extractive matter whether it contained any alkaloid or not. Three years later, when the 1890 U.S.P. was published, this very figure of 0·3 per cent. total alkaloids was adopted as the standard.

Other ten years have passed, and now, after nearly twenty-five years or thereby of unofficial standardization, the official mind has at last recognized the value of the principle, and upwards of fifty drugs and preparations are subjected to processes of standardization. This is surely a triumph for those pharmacists who have, in face of strenuous opposition and criticism, maintained that standardization was the only scientific basis in the preparation of galenicals. As it is quite likely that the next edition of the British Pharmacopœia will follow the lead that the U.S.P. has given, a statement of the new standards should prove of more than passing interest.

With regard to the drug strength of tinctures, the editors have made an attempt at uniformity,all the more potent tinctures being now made 1 in 10, these including aconite, belladonna, cannabis, cantharides, digitalis, hyoscyamus, strophanthus, etc., while the strength of the tinctures of the less potent drugs has been made 1 in 5. Generally speaking, the alkaloidal tinctures are 1 in 10, and the standard of alkaloid in the tincture is, in most cases, placed at a shade less than one-tenth, or one-fifth, as the case may be, that of the alkaloid in the drug. This uniformity in drug strength naturally involves a want of uniformity in dosage.

It will be convenient to place in tabular form all the standardized drugs and the preparations made therefrom that are standardized.

Standards of Drugs and Galenicals Adopted in the New U.S.P.

(Weight percentage in drugs and solid extracts: w/v percentage in Fluid Extracts and Tinctures.)

Drugs.	Chief Constituent.	Minimum Prcntage] in Drugs.	Standard in Solid Extract.	Standard in Fluid Extract.	Standard in Tincture.
Aconite root . .	Aconitine . . .	0·5	—	0·4	0·045
Belladonna leaves.	Mydriatic alkaloids	0·35	1·4	—	0·035
Belladonna root .	Mydriatic alkaloids	0·5	—	0·5	—
Cinchona . . .	Ether-soluble alkaloids	4·0	—	4·0	0·75
Coca	Ether-soluble alkaloids	0·5	—	0·5	—
Colchium corm .	Colchicine . . .	0·35	1·4	—	—
Colchicum seed .	Colchicine . . .	0·55	—	0·5	0·05
Conium . . .	Coniine	0·5	—	0·45	—
Guarana . . .	Alkaloids . . .	3·5	—	3·5	—
Hydrastis . . .	Hydrastine . .	2·5	—	2·0	0·4
Hyoscyamus . .	Mydriatic alkaloids	0·08	0·3	0·075	0·007
Ipecacuanha . .	Alkaloids . . .	2·0	—	1·75	—
Jalap	Total resin . . .	8·0	—	—	—
Nux vomica . .	Strychnine . . .	1·25	5·0	1·0	0·1
Opium	Morphine . . .	12–12·5	20·0	—	1·2–1·25
Physostigma . .	Ether-soluble alkaloids	0·15	2·0	—	0·014
Pilocarpus . . .	Alkaloids . . .	0·5	—	0·4	—
Scopola . . .	Mydraitic alkaloids	0·5	2·0	0·5	—
Stramonium . .	Mydriatic alkaloids	0·35	1·4	0·35	0·03

Before proceeding to criticize the new standards, we may refer to the few drugs that were standardized in the previous Pharmacopœia. These consisted of cinchona, the standards of which were, for the bark and fluid extract 5 per cent. of total alkaloids, of which at last half should be quinine, the tincture not being standardized; opium, 13 to 15 per cent.; extract of opium, 18 per cent. and tincture 1·3 to 1·5 per cent. of morphine; nux vomica extract, 15 per cent.; fluid extract, 1·5 per cent., and tincture 0·3 per cent. total alkaloids; jalap, of which the standard was 12 per cent. alcohol-soluble resin, and not more than 1·2 per cent. soluble in ether, whereas the new standard is 8 per cent. total resin, and not more than 1·5 per cent. soluble in ether.

The first feature that strikes one on looking over this table is the very apparent fact that the standards are what we may call natural rather than artificial, standards. Previous to the publication of the present B.P. we used to look upon a liquid extract as being a preparation of which one fluid ounce represented an ounce of the drug, and a solid extract as being approximately four or five times stronger than the drug from which it was made. But the 1898 B.P. upset these ideas to a considerable extent, some very important preparations being made stronger, and others weaker, than what we have called the natural standard. The object of this is intelligible enough, namely to harmonize the dosage of potent preparations, but it does not follow that it was the wisest thing to do. Obviously it will always be a difficult matter to carry out artifical rules of this kind to a logical conclusion, and hence it is a debatable point whether it would not have been better for the question of dosage to adjust itself without introducing arbitrary standards such as I refer to.

A few notes on the more important drugs and the standards adopted will illustrate my remarks.

Aconite Root.—The standard adopted appears surprisingly high, and when the dose of aconitine and the dose of fluid extract of aconite are compared, the surprise is not lessened. The "average dose" of the alkaloid is $\frac{1}{400}$ grain, and that of the fluid extract is 1 minim, equal to $\frac{1}{300}$ grain, which apparently is too high, in fact, according to notions of dosage in this country for aconite, it is excessive. The tincture is still farther out, the "average dose," 10 minims, being equal to $\frac{1}{266}$ grain aconitine. If any departure from the natural standard should ever be legitimate, I think aconite would have been a suitable case.

Belladonna Leaves and Root.—So much has been written on belladonna that it seems supererogatory to write more. The standard for belladonna leaves, namely 0·35 per cent., is in accordance with what has long been recognized by good authorities as a fair average; and while the percentage of alkaloid was found in one sample to be as high as 1·32 per cent. by Messrs. Farr and Wright, they also found it as low as 0·14 per cent., their average being 0·54 per cent. It has to be noted, however, that the term "dried" is not a constant one, and a good deal may depend on whether the drug is dried in warm air or is simply air dried. It will be observed that there is only one extract, and it is an alcoholic extract made from the leaves. This is assayed to be exactly four times the strength of the leaves, that is 1·4 per cent. of alkaloid, sugar of milk being used if necessary as a diluent. The tincture is assayed to one-tenth the alkaloidal strength of the leaves. The standard for *belladonna root* is fixed at a minimum of 0·5 per cent., and the fluid extract must also contain a similar percentage. This strength compares favourably with that of the British Pharmacopœia. The root assays from 0·14 to 0·8 per cent. of alkaloid, but very rarely is it found of the higher strength, or even of 0·75. White recommends the use of a root with a minimum of 0·4 per cent. of alkaloid for producing the B.P. preparations, but so long as the official requirement for the liquid extract is as high as it is, it will not be possible to get uniformly satisfactory results.

Coca.—The standard adopted for coca has been long used unofficially, and it is also recommended by such authorities as Mr. J. C. Umney, namely 0·5 per cent. of ether-soluble alkaloid.

Colchicum Corm is used in the preparation of the extract, and the standards are respectively 0·35 and 1·4 per cent. of colchicine. There are comparatively few published records of the alkaloidal strength of colchicum corm, but Schultze is reported as having found 0·6 per cent. of colchicine, and Parke, Davis, & Co.'s laboratory records show a variation of from 0·3 to 0·75. *Colchicum Seeds*, which are used for the tincture, must have a minimum of 0·55 per cent., and the fluid extract 0·5 per cent., the latter figure having been in constant unofficial use for many years.

Conium Fruit must show, at least, 0·5 per cent. of coniine, and the fluid extract 0·45 per cent. Farr and Wright have found a much higher average than this in specially collected fruits, and apparently also in commercial samples. With reference to their figures we fear they must be ruled out as impracticable, for the reason that they were dealing with thoroughly dried material. It is evident that in using fruit dried in warm air they obtain a result relatively higher in alkaloid by just the proportion of water removed over and above that ordinarily present in the commercial drug. It is evident that standards should be based upon commercial drug of fair quality, such as is ordinarily obtainable on the market, and not on drug that has been subjected to special preparation, unless, of course, it be conceded that drug commercially obtainable is so deficient in activity as to demand a special concentration. Whether this is, or is not the case with conium may be arguable. The U.S.P., in common with the B.P., requires "full-grown but unripe fruit," and since it may be easier to harvest the ripe than the unripe fruit, the latter of which, Farr and Wright have shown, contains the greater proportion of alkaloid, it is perfectly possible that the commercial samples are inferior on that account. It may also be noted that Farr and Wright state their figures as percentages of coniine hydrochloride. The U.S.P. estimates the alkaloid as hydrochloride but reduces it by multiplying by the factor 0·777. Applying the same method to Farr and Wright's figures, their average for commercial conium works out at 0·52 per cent., and for hand-picked fruit at 1·65 per cent. while the difference in dryness will still further reduce their percentage.

Hydrastis has long been unofficially standardized on the basis of 2·5 per cent. of the white alkaloid, hydrastine; but while the U.S.P. requires the drug to contain a minimum of 2·5 per cent., it specifies only 2 per cent. for the fluid extract, allowing for a loss of 20 per cent. of the alkaloid in manufacturing, which appears to be excessive.

Hyoscyamus.—The consensus of opinion in this country is in favour of a standard for hyoscyamus approximating 0·08 per cent. of alkaloids, and it is quite satisfactory to find that this figure is also recognized in the United States as being a fair minimum, though one firm of manufacturers has always placed the standard at 0·1. For the solid extract the U.S.P. requires 0·3, practically four times higher than the drug. It will be recalled that at the last Conference, Farr and Wright advocated 0·2 per cent. of alkaloid and the present writer suggested 0·4; the U.S.P. has thus "split the difference" and made it 0·3.

Ipecacuanha.—The reduction of the standard to 1·75 per cent. of alkaloid, as compared with 2 per cent. for the drug, appears to be a mistake. The alkaloidal content of Rio ipecac., according to Parke, Davis & Co.'s records, varies from 1·7 to 2·7, and of Carthagena root from 1·8 to 3 per cent., so that it seems unwise to reduce the standard for the fluid extract to what is practically the lowest strength found in commerce.

Jalap.—The curious fall in the resin-content of jalap has been experienced in the U.S. as well as in this country, and the U.S.P. committee have had to modify their standard accordingly. Various standards have been in use in different pharmacopœias, as Mr. Umney has pointed out, 18 per cent., 16 per cent., 12 per cent., 9–11 per cent., 10 per cent., 9 per cent., 7 per cent., and now the U.S.P. places the figure at 8 per cent., which has been unofficially used in America for some years.

Physostigma.—The standard adopted, 0·15 per cent. of alkaloid comes between the figure recommended by Umney, 0·125, and that for many years adopted by Parke, Davis & Co., 0·2. The standard for the solid extract, 2 per cent., indicates that the extract is thirteen times stronger than the bean, but even so it is still much below the figure usually found in the extract as prepared, and recourse is had to the use of powdered liquorice to dilute it to the proper strength. The new U.S.P. extract is probably considerably stronger than the extract of the B.P.

Pilocarpus (*Jaborandi*).—The U.S.P. recognizes both the nitrate and the hydrochloride of pilocarpine, and it seems a pity that this alkaloid should not also have been made the basis of the standard, in place of the "alkaloids (mainly pilocarpine)," the actual composition of which may vary to a greater or less degree.

Scopola.—The only new alkaloidal drug introduced is scopola, the standard for which is said to be 0·5 per cent. "of its alkaloids," which are spoken of in the description of the extract and fluid extract as "mydriatic alkaloids." No doubt the variation is unintentional. Scopolamine hydrobromide is the alkalodial salt that has been made official, and in view of the importance now attached to the drug, both on account of its use as a source of alkaloid and of the peculiar value of that alkaloid in medicine, there can be no doubt that its inclusion is amply justified.

These notes are by no means intended to be exhaustive, but simply to draw attention to the extremely important steps now officially taken in the direction of standardization.

Mr. **Bird** asked, in regard to ipecacuanha, by what process the alkaloid was determined—whether by titration or not. In his experience the percentage varied from 1·2 to 2·3, which was considerably lower than the figures mentioned by Mr. Maben.

Mr. H. **Wippell Gadd** said he had noticed that some of the standards were rather high. For instance, the strychnine in nux vomica was given as 1·25. One did sometimes get that strength, but not on the average. With regard to belladonna root, of ten samples examined by him the average was 0·32, with a maximum of 0·49. He hoped the British Pharmacopœia authorities would not follow the United States Pharmacopœia in those particulars. He was disappointed to find that the use of Carthagena ipecacuanha was now sanctioned in the U.S.P. With the exception of these minor criticisms he thought the new volume was a very great advance on former ones.

Mr. J. C. **Umney** said it was interesting to those who had worked on the standardization of galenicals and alkaloidal standards to note that the results of the workers in the United States closely agreed with theirs. Mr. Gadd had referred to the low percentage of alkaloid in belladonna root. His observation was that the lower alkaloidal value had been only this last two years, and that was the reason why the 0·5 might be considered a little high—0·45 would not be out of order. The reason the strength of jalap has been reduced was, he thought, due to the low figures obtained with the rejections of the United States markets sent here—that was the reason why a great deal had been written about the standard of jalap. He did not think there was any real necessity for the reduction of the standard. With regard to preparations of pilocarpus, he had given a good deal of attention to jaborandi, and he must confess he hoped in the British Pharmacopœia they would get away from the galenical preparations altogether, and that the alkaloid pilocarpine would be recognized. There were two varieties of pilocarpus which yielded pilocarpine, so that there would be no difficulty in getting the leaves; while there was a difficulty in obtaining the official leaves. He was sorry Mr. E. M. Holmes was not present to tell them more about that point. The new U.S.P. would well repay careful study.

Mr. F. H. **Alcock** rather regretted that Mr. Maben had confined his remarks to the standards of the U.S.P. He would like to emphasize what Mr. Umney said in regard to jalap. Some weeks ago he examined a very old sample of jalap, and found 18 per cent. of resin, but on examining present-day samples he found they did not come up to the B.P. standard. Jalap was very much like opium and cochineal—it was made to order according to the price paid. With regard to the general features of the U.S.P., he was very sorry, as a teacher of pharmacy, that the authorities had not decided as to which is better—to weigh or to measure. He thought wholesalers would agree that to weigh in making preparations was more likely to be accurate than to measure. In measuring so much depended upon temperature that he thought it would be better if the B.P. authorities would take the bull by the horns and insist that in making the preparations they should be by weight. He was basing his criticism on the new U.S.P., and he noticed that with regard to preparations containing turpentine, water, and glycerin the procedure was as varied as it was possible to be. In some cases the liquid was weighed, and in other cases measured. There seemed to be no definiteness. Take, for instance, "glycerin and water equal parts." Now, what was meant by "parts"? That was always cropping up. Dr. John Attfield found it to be a lot of trouble, and Mr. Bird would say he could not answer the question even in connexion with his own formula for the official preparation of concentrated infusion of senega. Mr. Bird could only say it was an interesting question. He hoped in future the authorities would decide upon everything being by weight. Whether it would affect the dosage he did not know. He noticed the doses in the U.S.P. were in weight and also in measure, so that the question of weight or measure had nothing to do with dosage. Perhaps they would be told it would lead to the continental method of weighing medicines, but he did not think that necessarily followed, though in manufacturing he thought it ought to be by weight.

Mr. R. A. CRIPPS agreed with Mr. Umney that it was only within the last two years that there had been any difficulty in obtaining belladonna root assaying 0·5 per cent. He remembered assaying a number of typical samples which yielded a good deal more total alkaloids. It rather showed that the old sources of belladonna root were becoming exhausted, and collectors had been going farther afield. With regard to ipecacuanha, Mr. Bird mentioned 2·3 per cent. of alkaloid. He had found in Rio ipecacuanha up to 3·0, but that was exceptional. He had found it varied between 2·0 and 2·6. He had never met with a sample of Carthagena which yielded anything near 3·0 per cent. In regard to jalap, years ago there were large quantities of jalap assaying something like from 5 per cent. up to 9 per cent., and he had had samples yielding from 15 to 17 per cent. of resin.

Mr. E. F. **Harrison** asked if, in assaying aconite root, any effort was made to get the pure aconitine, as he knew of no satisfactory method of separating it quantitatively from the other alkaloids present. If it was the total alkaloid, $\frac{1}{250}$ of a grain might be very insignificant, but if it was pure aconitine it would be dangerous. With regard to assaying jalap, some years ago he got samples from various wholesalers, and he did not think one came within the B.P. limits of 9 to 11 per cent. of resin; some gave as low as 6 per cent. and others as high as 18 per cent. There was one point about jalap he would like to mention, and that was that in a given batch the percentage of resin appears to be governed by size of the tubers. A small tuber might yield 6 per cent. and the larger tubers of the same batch 14 or 15 per cent. of resin, and he thought that fact might account for the discrepancy in the results obtained in assaying jalap.

Dr. **Symes** supported Mr. Umney's statement as to the advantage of excluding galenical preparations of pilocarpus and making pilocarpine the standard, because of the difficulty of finding jaborandi which conformed with the B.P., while there was plenty available for pilocarpine, which seemed to represent the active principle of jaborandi.

Dr. **Attfield** said that at page 29 of the new U.S.P. the strength of aconite was given in terms of "aconitine" and not in "total alkaloids." He recommended a careful study of the preface of the work before launching into criticism of the new Pharmacopœia.

Mr. **Harrison** said, in reply, that he saw by a copy of the U.S.P. just handed to him that the authorities considered the ether-soluble alkaloid as aconitine.

Mr. **Maben**, in reply, said that the alkaloid in Rio ipecacuanha was estimated by titration, but he was not in a position to give the details of the process. As to the percentage of strychnine in nux vomica, it would be observed that the fluid extract only required 1 per cent. of strychnine. It was rather curious, perhaps anomalous, that with a considerable number of the galenical preparations they allowed a certain amount of loss in manufacture, while with others there was no loss allowed for, the amount in the fluid extract being the same as the standard for the drug. He agreed with Mr. Umney as to the extreme closeness with which workers in the United States agreed with the work done on this side. As to the remark about aconitine, the U.S. Pharmacopœia gave an average dose of $\frac{1}{400}$ of a grain, which was regarded as an average dose of pure crystalline aconitine, and he assumed it was pure aconitine ; but he quite accepted Mr. Harrison's remark that it might not be the case. He might say that he had intended to give a more general paper, but found it would be too extensive to deal with on this occasion.

THE ESSENTIAL OILS OF THE UNITED STATES PHARMACOPŒIA.

By John C. Umney, F.C.S., and C. T. Bennett, F.C.S.

New editions of pharmacopœias are invariably of interest to British pharmacists, and when the time comes round for the decennial revision and publication of the United States Pharmacopœia we look forward with eager expectation to an up-to-date book in our own language. The last edition of the United States Pharmacopœia, although dated 1890, was not actually published until 1894, and in the interval, of course, there has been a new British Pharmacopœia in 1898, and subsequently a revised German Pharmacopœia (1900). During this interval in no department of research have greater strides been made than in the systematic study of essential oils, and the most modern research on the subject is reflected in the pages of the new United States Pharmacopœia.

Specific Gravity.

It should be noted first of all that a new temperature has been utilized as a standard for the taking of specific gravities. These are now taken at 25° C. (as compared with distilled water at the same temperature)—no doubt a convenient temperature in parts of the United States of America ; and although such a temperature would perhaps be very little more convenient to us in this country than the 15° C. at which we record our results, yet it would certainly possess some advantage in summer. Of course this makes a slight difference when compared with specific gravities recorded at 15° C., in the majority of cases the difference being from four to six units in the third place of decimals, according to variation of the cubical co-efficient of expansion.

OPTICAL ROTATION.

It will be noticed that in almost all the monographs limits of optical rotation are recorded, whereas in the previous United States Pharmacopœia these were included in only a very few instances. There is very little difference between the limits given for a temperature of 25° and those recorded at 15° or 20°, the variation being almost negligible for all practical purposes. There can be no question that, in the absence of actual quantitative methods for the determination of the important constituents of an oil, limits of optical rotation with other physical constants form an excellent criterion of purity.

SOLUBILITY TESTS.

It will be noticed that there is almost complete abandonment of the solubility tests in such liquids as glacial acetic acid and bisulphide of carbon. In fact, we notice in going through the various monographs in the last United States Pharmacopœia the solubilities in glacial acetic acid described under the following oils—orange, clove, cinnamon, coriander, erigeron, eucalyptus, fennel, pennyroyal, lavender, lemon, peppermint, spearmint, nutmeg, pimento, rosemary, savin, sassafras, turpentine, and thyme —and in bisulphide of carbon under the following—eucalyptus, pennyroyal, juniper, lemon, peppermint, spearmint, nutmeg, pimento, sassafras, mustard, and thyme—are now omitted.

VALUATION OF IMPORTANT CONSTITUENTS.

The most important feature is the extensive introduction of the valuation of essential oils by their important constituents, and processes are now included for the valuation of most oils where the medicinal or odour value depends on a single body. In criticizing the individual monographs we shall refer to the suitability or otherwise of the particular standards fixed. Suffice it to say, however, that the processes appear, on the whole, to be well selected, and doubtless the work will have a wider acceptance, perhaps, than the particular purpose for which, according to the preface, it is designed, namely: "The standards of purity and strength prescribed in the text of this Pharmacopœia are intended to apply to substances which are used solely for medicinal purposes, and when professedly bought, sold, or dispensed as such."

OMISSIONS AND RETENTIONS.

It will be noticed that in the new work three volatile oils are omitted—viz., bergamot, orange flower, and bay oils. The omission of these oils appears rather to be by definite purpose with a view to supporting the preceding statement. Although bergamot, orange flower, and bay oils are substances of large sale, extensively used for toilet preparations, yet in no instance are they of distinct medicinal value. It strikes us as curious that two oils practically unknown in British pharmacy are still retained—the oils of chenopodium and erigeron. We are informed the latter is used to some extent in veterinary practice, and is distilled mostly by the leading peppermint growers, but the trade is, of course, a very unimportant one compared with that of other staple products.

ADDITIONS.

The new United States Pharmacopœia includes monographs for certain products which have already become established as of considerable importance in medicine and perfumery. There can be no question that vanillin is a substance of the greatest importance, and we might almost go so far as to say that the low market prices of vanillas are, to some extent, due to their replacement, especially for perfumery purposes, by synthetic vanillin. Benzoic aldehyde, now introduced, will be of value in replacing almond oil, now that it can be commercially obtained practically free from chlorine products. Safrol is of undoubted medicinal value, and, as it can be produced more cheaply from other oils than sassafras, we certainly favour its inclusion. The United States Pharmacopœia does not follow the lead of the German Pharmacopœia in the introduction of chemical constituents from volatile oils under the name of the oils themselves. The last German Pharmacopœia includes pure carvone as Ol. Carvi, anethol as anise oil, and pure eugenol as oil of cloves.

MATERIALS FOR DISTILLATION.

It will be noticed that most precise instructions are given as to the material for distillation, etc. For example, oil of peppermint is required to be distilled from the fresh or partly dried leaves and flowering tops.

RECTIFICATION OF OILS.

It is noticeable that in several instances the United States Pharmacopœia for the first time recognizes the rectification of essential oils, and reference to the monographs of the oils of caraway, eucalyptus, peppermint, spearmint, and others will show that in each instance the oils intended to be official are not the simple primary distillates, but oils rectified by steam distillation, and thus, to some extent, fractionated.

STORAGE OF ESSENTIAL OILS.

One of the features of the United States Pharmacopœia has always been instructions as to storage, but these instructions in the present edition have been elaborated, and we think we cannot do better than quote those given for the storage and handling of anise oil and bitter orange oil to show how minute they are. Anise oil, it says, "should be kept in well-stoppered, amber-coloured bottles, protected from light, and, if it has separated into a liquid and a solid portion, it should be completely liquefied by warming and then well shaken before being dispensed"; while orange oil "should be kept in small, well-stoppered amber-coloured bottles, in a cool place, so as to avoid as far as possible the development of a terebinthinate odour. Oils that have developed such an odour should not be dispensed." Viewed all round, there can be no question that the monographs are in themselves models of what such monographs intended for guidance in medicine should be, and in our opinion they go very decidedly farther, and are likely to be of great value to all manufacturing pharmacists, and also to those who may handle essential oils, and record the principal features in a concise form for judging purity and value.

OLEUM ANISI.

The new United States Pharmacopœia includes as a source of this oil for the first time star anise as well as Pimpinella anise, both of which varieties have been official in the British Pharmacopœia of 1898 and 1885. The oil of anise fruit alone is official in the last published German Pharmacopœia, but that is a fractionated oil consisting almost entirely of anethol, with a melting point of 20° to 21° C., and a higher specific gravity than the normal oil now made official in the United States Pharmacopœia. The range of specific gravity of the oil is certainly an excellent one, but the optical rotation should read lævo-gyrate *up to* —2°, which is in accordance with our observations, based upon the examination of a very large number of samples.

The observations of one of us (John C. Umney, *Y.-B.P.* 1889,

p. 183) on the congealing point of oil of anise have been noted, and the monograph recognizes how anise oil may, if left undisturbed, be cooled to a temperature of 6° C. without solidification, notwithstanding that the true congealing point is about 15° C. This monograph is an excellent one, and contains all the necessary details.

OLEUM AMYGDALÆ AMARÆ.

It will be noted that volatile oil of bitter almonds may now be obtained from the bitter almond and other seeds containing amygdalin—that is to say, the volatile oil of apricot and peach kernels is also admissible. It is, however, required that the oil shall contain more than 85 per cent. of benzoic aldehyde and between 2 and 4 per cent. of hydrocyanic acid. The specific gravity has been lowered from 1·060–1·070 at 15° C., to 1·045–1·060 at 25° C., which is a reduction more than proportionate to the different temperature at which the determination is now made. Under the tests it is particularly set out that the oil of bitter almond containing crystals of benzoic acid—that is to say, which had undergone oxidation—should not be dispensed.

BENZALDEHYDE ESTIMATION.

This is a modification of Sadtler's process as adopted for lemon oil. The estimation is one not likely to give identical results in the hands of different operators. The end reaction is not sharp, and comparative results will only be obtained by practice (see notes on lemon oil). The object of mixing with kerosine is presumably to diffuse the oil over a greater surface. The small quantity of oil required to be used (12 drops) is rather disadvantageous, and up to the present our results rather lead to the belief that the ordinary aldehyde absorption process as used for the determination of cinnamic aldehyde in cassia oil is preferable.

HYDROCYANIC ACID ASSAY.

The process included is that of Kremers and Schreiner. There is at the outset a difficulty in preparing magnesium hydroxide free from chloride; a blank experiment is therefore necessary, and the proportion of chloride found in the magnesium salts must be deducted from the total reading. The process appears to yield lower results than those we have obtained on a manufacturing scale in the removal of hydrocyanic acid from bitter almond oil, but we have not, so far, had the opportunity of comparing the various processes. Our records, extending over a great many years, would appear to indicate in the freshly prepared oil of bitter almond a higher proportion of hydrocyanic acid than 4 per cent.

OLEUM AURANTII CORTICIS.

The oils of bitter and sweet orange peel were both official in the United States Pharmacopœia of 1890, whilst the oil from the peel of the sweet orange is now alone official. For flavouring elixirs and syrups the sweet variety is preferable, and hence the inclusion on the present occasion. The characters and tests are satisfactory, although the optical rotation of not less than +95° is perhaps a little higher than necessary: over + 92° would probably have been a sufficiently stringent test. The tests include one for the presence of pinene determined by the melting point of its nitroso compound.

OLEUM BETULÆ.

This oil is now directed to be prepared *by maceration* and distillation from the bark of *Betula lenta*, and is stated to conform to the reactions and tests of Ol. Gaultheriæ, which oil is stated to have the same properties as methyl salicylate, although no references are made under oil of gaultheria to its similarity to Ol. Betulæ. At any rate, there is clear indication in the monographs referred to that the synthetic methyl salicylate, when chemically pure, is bound to rapidly replace the natural oil, whether from gaultheria or sweet birch.

OLEUM CAJUPUTI.

This oil is required to yield not less than 55 per cent. by volume of cineol, and to have a specific gravity of 0·915 to 0·925 at 25° C. This is a lower range of specific gravity than that of the B.P., 1898 (922–930 at 15° C.), but approximating to that suggested by one of us (see *Year-Book of Pharmacy*, 1904, p. 44)—namely, a minimum specific gravity of 0·919 at 15°. A minimum of 50 per cent. cineol would be more in accordance with this minimum specific gravity. It will be remembered that the British Pharmacopœia, although requiring the oil to give a semi-solid mass with concentrated phosphoric acid, gives no actual percentage. The phosphoric acid of the new United States Pharmacopœia has a specific gravity of 1·707 at 25° C.

There is one test which is not quite clear—viz., the test for the absence of copper as follows: "On shaking 5 c.c. of the oil with 5 c.c. of water containing one drop of dilute hydrochloric acid, a reddish-brown colour should not be produced in the acid liquid, when separated from the oil, if a drop of potassium ferrocyanide T.S. be added (absence of copper)." But should such test be insisted upon, then we assume that there is no necessity for the inclusion in the description of the words, "a greenish liquid," as the green colour of cajuput oil is entirely removed by the shaking it with a solution of ferrocyanide of potassium, indicating that it is due to the presence of copper.

OLEUM CARI.

This oil is one required to be rectified by steam distillation, and the characters of the oil are really very close to those suggested by one of us (J. C. Umney, *Y.-B.P.*, 1895, p. 165), including as they do a minimum specific gravity of 0·905 at 25° C. (practically equivalent to 0·910 at 15°), and an optical rotation between +70 and +80. No process has been included for the determination of carvone, but these physical characters are quite sufficient to ensure an oil containing over 50 per cent. of carvone.

OLEUM CARYOPHYLLI.

We have already referred to the fact that the oil official in the German Pharmacopœia is pure eugenol. The United States Pharmacopœia, however, prefers to maintain the natural oil of cloves with a fair range of specific gravity, and yielding by the alkali absorption process recommended by one of us (Umney, *Y.-B.P.*, 1895, p. 167) 80 per cent. by volume of eugenol. It has been shown that the strength of alkaline hydroxide solution used for absorption of the phenols makes some little difference in the percentage recorded (see *Y.-B.P.*, 1903, p. 64), and our experience shows that the difference in absorption of phenol, using 5 and 10 per cent. solutions of caustic potash, is 84 per cent. in the former case and 89 per cent. in the latter, where the combined eugenol is entirely decomposed. The range of specific gravity is, in our opinion, a fair one. The most aromatic clove oils are those of comparatively low specific gravity, given, of course, that the eugenol content is sufficiently high. We find that an oil of specific gravity 1·040 at 25° C. contains from 82 to 84 of eugenol by volume by the process of the United States Pharmacopœia—namely, 5 per cent. solution of caustic potash.

OLEUM CINNAMOMI (CASSIA OIL).

Under the Latin title of Ol. Cinnamomi the oil of cassia cinnamon is included, and, of course, this must not be confused with the oil of the British Pharmacopœia derived from *Cinnamomum zeylanicum*. The title, however, is rather misleading, especially as two cinnamon barks (*C. saigonicum* and *C. zeylanicum*) are official, but not the bark of *C. cassia*. That the oil from *Cinnamomum zeylanicum* is decidedly preferable in point of odour and taste (especially taste) there can be no question, but, of course, containing as it does a lower percentage of the medicinally valuable substance, cinnamic aldehyde, it has, no doubt, been thought wise to retain the oil of cassia rather than that of cinnamon.

The process included for the valuation of the cinnamic aldehyde is the one in general use; and we are of opinion that the limit fixed of not less than 75 per cent. is a fair one, although most pure oils contain 80–85 per cent. by volume of aldehydes. The test for the absence of petroleum and resin is valuable, more especially when the oil is at higher rates than are now ruling. Many oils containing only 75 per cent. of aldehydes contain added resin; but so long as there is a demand for low-grade oils this sophistication will probably continue. Whether the oil will be replaced by cinnamic aldehyde at a later date remains to be seen. Our experience of cinnamic aldehyde is, so far, not favourable, as it appears always to possess a suspicion of the odour of benzoic aldehyde, which is not present in the natural cassia oil, and which is certainly a disadvantage.

OLEUM COPAIBÆ.

The monograph of the present Pharmacopœia differs in two respects from that of the previous edition. The specific gravity is now 0·895 to 0·905 at 25° C., whilst formerly it was from 0·890 to 0·910 at 15° C., which is practically equivalent. It is also now required to be soluble in two volumes of alcohol (95 per cent. by volume), whilst formerly ten volumes were required, and for the first time there is included the requirement that it should be lævo-gyrate, although no limits are given.

OLEUM CORIANDRI.

The monograph is in accordance with all our records for pure oils, and the solubility in three volumes of 70 per cent. alcohol, as well as the range of optical rotation which is now included for the first time, namely, from +70° to +14° are normal. It should be noted that there is no special warning against specific adulterations.

OLEUM CUBEBÆ.

The only new feature is that the optical rotation is included, ranging from −25° to −40°. The statement, however, regarding specific gravities is somewhat altered, being now 0·905 to 0·925 at 25° C., whilst formerly the requirement was "about 0·920 at 15°."

OLEUM ERIGERONTIS.

We have little experience of this oil except from our casual examination of samples, principally from the American source. The oils we have examined, however, correspond with the present official requirements, and it is curious that an oil of sufficient importance to include in the United States Pharmacopœia should not be more utilized in this country.

OLEUM EUCALYPTI.

The present Pharmacopœia gives no particular specific source for the derivation of the oil, but requires simply that it shall be rectified by steam distillation and yield not less than 50 per cent. of cineol, the usual assay as cineol phosphate being given, using 85 per cent. phosphoric acid and petroleum ether. In our opinion 55 per cent. would be a better minimum for an oil for medicinal purposes. The B.P. gives no actual percentage, but the wording of the monograph makes the oil practically identical. Oil of the amygdalina class, especially those containing phellandrene, are excluded by the usual nitrite test.

OLEUM FŒNICULI.

The same precise directions are given for the storing and dispensing of this oil as in the case of anise oil, and the highest point reached during crystallization is also recorded as the congealing point (see anise oil), which should not be below 5° C. There is usually some difficulty in starting crystallization unless a crystal of anethol is available. The specific gravity is now stated as from 0·953 to 0·973 at 25° C. The lower limit practically coincides with that formerly official. We have not met with any oil of fennel sophisticated with volatile oils containing phenols for which a test is included. The detailed characters of the different varieties of fennel oil are set out in the paper by one of us (John C. Umney, *Y.-B.P.*, 1897, p. 165).

OLEUM GAULTHERIÆ.

The oil is now a rectified oil, and is described as colourless, or almost colourless, reference to its occasional reddish tint being omitted in the present edition. In several samples recently examined this reddish tint was most pronounced. The tests agree with those of the samples we have examined during the past ten years.

OLEUM HEDEOMÆ.

The oil is now stated to be distilled from the leaves and flowering tops, whilst formerly the detailed description of source was not stated. The specific gravity has been somewhat lowered. It is now from 0·920 to 0·935 at 25°, formerly from 0·930 to 0·94 at 15° C. Our experience of American pennyroyal is comparatively limited, but examinations of European samples of Spanish, French, and Portuguese origin show that these, as a rule, have a specific gravity within the limits 0·935 to 0·945 at 15° C.

OLEUM JUNIPERI.

The range of specific gravity has been very much reduced. Whilst formerly it was from 0·850 to 0·890 at 15° C., it is now from 0·860 to 0·880 at 25° C. We find, as a matter of fact, that the majority of samples of juniper oil, when freshly distilled, have a specific gravity of 0·862 to 0·867 at 15° C. The solubility test, viz. 1 in 10 volumes of 90 per cent. alcohol, is a little too stringent, as it will exclude some pure oils except when freshly distilled.

OLEUM LAVANDULÆ FLORUM

is now described as distilled from the fresh flowering tops, whereas in the 1890 edition the word flowers alone is used. It is noticeable in the monograph for lavender oil there is no recognition of the determination of ester percentage, or, indeed, any method for its valuation, the only tests for purity in addition to specific gravity being its solubility in 70 per cent. alcohol—namely, one in three—and a test for added alcohol. As a means of valuing oils of one class, say French oil, the determination of ester valuation is of importance, though the fragrance of many oils when the percentage of ester is much over 39 is not enhanced (see *C. and D.* August 9, 1902, p. 248).

On the other hand, there is a necessity to judge of the purity of English lavender oil by limit of esters, and therefore one can see the difficulties of the compilers of the United States Pharmacopœia in trying to arrange a monograph that would include high-value French lavender oils, but which would exclude English oils, or *vice versâ.* Perhaps it was the wisest way out of the difficulty. How it will be treated in a new British Pharmacopœia remains to be seen, perhaps by the inclusion of English oils only, which would give a much-needed impetus to the lavender cultivation in this country.

OLEUM LIMONIS.

The specific gravity limits—viz. 0·851 to 0·855 at 25° C.—will include most commercial oils of good quality. The minimum figure for optical rotation—viz. +60°—appears to be a little high, as we have examined pure oils in some seasons with a rotation of +59°. A maximum of 64° might have been stated. For the determination of citral Sadtler's method has been included. It is, perhaps, the most satisfactory of published processes, but it still leaves something to be desired. In the titration the end reaction is not sharp, and it is likely to give good results only in experienced hands. In Sadtler's original paper (*Amer. Journal Pharm.*, February, 1904, p. 84) he recommends rosolic acid as indicator, and states that the end reaction must be taken when only a very faint pink colour remains, which is not appreciably affected by a few drops more acid. Again, he recommends 25 to 50 c.c. of 20 per cent. sodium sulphite solution for 5 to 10 gm. of oil, while the new Pharmacopœia directs only 25 c.c. to be used for about 15 c.c. of oil. This seems to us an insufficient quantity, as better results are obtained with double the quantity or the equivalent of a stronger solution of sodium sulphite. Our experiments with this process show from 3·8 to 4·4 per cent. as normal limits for pure oils of commerce.

The minimum limit for citral—namely, 4 per cent.—is, in our opinion, quite high enough, as it has been recently proved by English chemists and manufacturers that the percentage of citral in lemon oil rarely exceeds 5 per cent., in spite of the statements of Italian chemists that 6 to 7 per cent. is a normal figure. We prefer to rely on a careful examination of the different fractions distilled under reduced pressure for the detection of terpenes, etc., although this can hardly be described at length in a pharmacopœia. The requirement now included that the first 10 per cent. distilled should not differ from the original oil by more than 2° is the one official in the British Pharmacopœia, 1898, though this requires modification.

OLEUM MENTHÆ PIPERITÆ.

The oil now described is one rectified by steam distillation, and distilled in the first instance from the fresh or partly dried leaves and flowering tops. It is required to contain not less than 8 per cent. of ester and not more than 50 per cent. of total menthol free and combined as ester. It will be seen that the tests are much modified, and several of the colour reactions, more especially for determining the absence of camphor oil, oil of sassafras, and to some extent sophistication with Japanese oil, have been omitted. No doubt the intention of the 8 per cent. ester requirement is to obviate the inclusion of Japanese oil and to obtain an oil of as good value as possible. In making this limitation, however, the United States Pharmacopœia would appear to have gone very near precluding the use of some of the highest grade redistilled American peppermint oils. Certainly it will exclude some of the Mitcham and Cambridgeshire peppermint oils as normally distilled. We have records of very many samples of English peppermint oil of undoubted purity containing less than 8 per cent. of esters. We have recently referred in a paper on Sicilian peppermint oil to as high a percentage of esters as 29·4 per cent. contained in that oil, but in the majority of the finest American oils that we have examined the percentage of esters has varied between 7½ and 11 per cent. The method of assay of the alcohols and esters is the usual one adopted.

OLEUM MYRISTICÆ.

The limits of specific gravity are very little different to those which were formerly official, but a range of optical rotation has been included for the first time—viz., from +14° to +28°—which is in accordance with our experience, and the test detailed by one of us, which obviates the presence of fixed oil of nutmeg, as indicated by the oil leaving after evaporation a crystalline residue, is also included. The requirement seems to be in every way a necessary one when the oil is to be used in the making of sal volatile.

OLEUM PIMENTÆ.

The new United States Pharmacopœia requires that this oil shall yield not less than 65 per cent. by volume of eugenol, assayed by the potassium hydroxide absorption method, and the requirement certainly is a fair one, and one with which practically all good trade samples comply. It will be noticed that a very curious anomaly in the old monograph is modified. It was formerly stated that oil of pimenta had a clove-like odour; now it is stated that "it has a strong aromatic odour of allspice." The range of specific gravity has been altered and is now from 1·033 to 1·048 at 25° C.—that is to say, apart from the difference of temperature at which the specific gravity is taken, there is a lowering of the bottom limit. This is certainly an advantage, for the typical aromatic bodies are those with the lower specific gravity which are characteristic of the oil, although perhaps not adding to its medicinal value. All the tests, as in the case of clove oil, for the presence of other phenol bodies have been omitted.

OLEUM ROSÆ.

The monograph for oil of rose is certainly a satisfactory one, and the inclusion for the first time in any pharmacopœia of the saponification value is a point to be noticed. It is found that practically all samples of pure otto of rose of the highest odour value fall between the limits of 10 and 17, as set out in the detailed process for assay; as a matter of fact, the majority fall from 14 to 16·5. The range of specific gravity has been altered. It was from 0·865 to 0·880 at 20° C. in the last edition; now it is from 0·855 to 0·865 at 25° C.—a considerable and advisable lowering of the top margin. The point at which crystallisation first appears in the otto of rose on cooling is taken as the congealing point, and is required to be between 18° and 22° C. This is a little wider range than the German Pharmacopœia, which is between 18° and 21° C. Of course, given that the physical and chemical characteristics indicate purity, then it is advantageous not to have a higher congealing point than 20° C., as a higher congealing point indicates, naturally, a greater proportion of odourless stearoptene.

OLEUM ROSMARINI.

We are disposed to think that the minimum percentage of borneol—viz., 15 per cent.—fixed for rosemary oil is somewhat high. It is not an oil of very great medicinal value, although what medicinal value it has over and above that of the terpenes it contains is probably due to borneol. Our examinations of samples of rosemary oil obtained from different parts of Europe, etc., have shown the following percentages:—

French.	Spanish.	Italian.	Dalmatian.
18·2	12·3	10·8	13·1
14·3	11·6	10·3	13·5
15·0	12·4	10·7	12·4
13·8			
18·7			
13·2			
15·2			
12·4			
12·4			

It will be seen, therefore, that although some of the finest French oils do contain a higher percentage of borneol than 15, yet one to our minds quite high enough for minimum would have been 12·5 per cent. We have never examined a sample of pure oil having a higher rotation than +15° (the extreme limit fixed), that of some of the best oils that we have examined being as low as +3°. We have paid no great attention to the determination of the ester value of rosemary oil, but in the few determinations that we have made the minimum ester fixed would appear to be a satisfactory one, and one with which the French and Spanish oils comply readily.

OLEUM SABINÆ.

The oil is now required to be distilled from the fresh tops of savin, and this is a very important feature, as it practically means the elimination of a considerable proportion of the woody plants of savin, from which the oil has been in the past distilled in the south of France, and which has resulted in an oil being produced widely different to that official either in the present edition or the previous one. We are disposed to think, from the examination we have made of savin distillates, that there is a considerable difference in the product obtained in different countries, and there is, possibly, a slight difference in the variety of the savin itself. We have now an investigation of the subject on hand, the results of which we hope to publish at a little later date.

OLEUM SANTALI.

The oil is required when assayed by the usual acetylation process, to contain not less than 90 per cent. of alcohol, calculated as santalol, which requirement has been accepted as a commercial basis for some time past. There is practically no alteration in the important features of the monograph, except that the specific gravity has been lowered proportionately with the temperature at which it is taken, and the optical rotation of the oil is now required to fall between −16° and −20° in a 100 mm. tube. A special test is included for the absence of choloroform. This sophistication has not been met with to our knowledge in this country, but it is interesting as showing how what one may call a local sophistication may result in the inclusion of a special test for the detection of that particular adulterant.

Oleum Sassafras.

It is not in our province to discuss whether there is really ground for the inclusion of this oil, seeing that pure safrol is included, obtained from cheaper sources, and no doubt having also similar properties to the natural oil of sassafras distilled from the root, or, as now set out, "especially from root bark." The limits of specific gravity have been much narrowed; formerly they were from 1·070 to 1·090, now they are from 1·065 to 1·075 at 25° C., but within these narrower limits practically all pure samples fall. There is a decided difference between the odour of sassafras oil distilled from root bark and the oils blended with safrol from other sources, and it would almost appear necessary to rely on the odour test, as, so far as we know, no chemical test is available for the purpose.

Oleum Sinapis Volatile.

The monograph now states that the oil is derived from black mustard, freed from its fatty oil, and is required to contain, by the new process now included, 92 per cent. of allyl-isothiocyanate. The method adopted now is decidedly an advantage over that formerly official, being volumetric and not gravimetric, and being capable of easy application. It is interesting to note in the characters and tests, under the description, following the words "having a very pungent and acrid odour," is the sentence, "great caution should be exercised when smelling this oil"—presumably a guide to the unwary apprentice. The oil is one that, for pharmaceutical purposes, appearst o be going out of favour, due, no doubt, to the difficulty of its use in liniment form and the more extended application of mustard-leaves, plasters, etc.

Oleum Thymi.

This is an oil which we think, might also find a place in a new British Pharmacopœia. It is required to contain at least 20 per cent. by volume of phenols, and this requirement is a little lower than the limit suggested by us, viz., 25 per cent., distilling above 220° (see *P.J.* [3], 25 p. 1046). The method of assay is the usual one of absorption of phenols by alkali, in this case sodium hydroxide being used and not potassium hydroxide, as in the case of eugenol-containing oils. The oil is certainly of pharmaceutical importance, and possesses some advantages over the use of pure thymol in having a pleasant fragrance, and being, of course, less caustic than the pure substance, to which, in part, at any rate, its medicinal activity is due. The proportion of thymol and carvacrol (the two phenols) vary, in our experience, considerably in different samples of the oil, and especially in the samples of the closely allied origanum oils imported from Eastern Europe.

The PRESIDENT said Mr. Umney was an authority on the subject, and it was therefore particularly fitting he should give the paper. The standards of the U.S.P. seemed to be readily obtainable in practice.

Mr. THEO. BREWIS said he noticed that both eugenol and clove oil were admitted, and this was wise, since eugenol has, comparatively, no clove odour. He thought it was a pity that the U.S.P. should have, like the P. G. IV inserted the stringent sodium hydroxide test, as a eugenol containing only 0·5 per cent. of terpenes would fail to pass ; and the removal of last traces of terpenes would considerably increase the cost of manufacture. The specific gravity of clove oil is to be not below 1·040 at 25° C., which is equivalent to about 1·048 at 15° C., a bottom limit more in accordance with distillers' figures obtained on some freshly drawn oils, than the "not below 1·050" of the B.P., and, indeed, the oil distilled from the fragrant and expensive Amboyna cloves seldom comes up to 1·050. Then there are many pimento oils, the specific gravity of which is below the B.P. and U.S.P. figures, yet these oils are the more fragrant and are in greater favour with perfumers. The amount of hydrocyanic acid in bitter oil of almonds was very variable, as every manufacturer of Ol. Amygdal. Ess. s A.-P. knows, therefore the limitation of prussic acid content was advisable. He could confirm an observation of Mr. R. A. Cripps : that some absolutely genuine English oils of rosemary are lævo rather than dextro-rotary. The odour of oil of savin from fresh English plant, is much to be preferred to that from the dried plants.

The figures for other oils generally agreed with his experience.

A NOTE ON QUININE ACID HYDROCHLORIDE.

BY WILLIAM GARSED.

Pharmaceutical Chemist.

In a recent examination of this salt a noteworthy difference was found between the characters of different samples. The British Pharmacopœia gives the formula—

$$C_{20}H_{24}N_2O_2 \cdot 2HCl, 3H_2O,$$

—corresponding to 11·98 per cent. of water of crystallization, and requires that at 100° C. not more than 12 per cent. of water should be lost. No minimum figure is given, and thus any salt, from the anhydrous up to one containing three molecules of water, is admitted.

The following table shows the loss per cent. in five samples on heating for an hour to a temperature of 103° to 105° C. There was no further loss on reheating for half an hour.

No. of Sample.	1.	2.	3.	4.	5.
Loss per cent. . . .	0 3	3 3	1·8	nil	0·4

One molecule of water corresponds to 4 34 per cent., and it will be seen that in no case was this quantity present.

The Pharmacopœia also gives a titration test, in which 1 Gm. should require for complete neutralization not more than 2·5 c.c. of N/1 soda solution ; the test is based upon the assumption that one of the molecules of hydrochloric acid behaves in solution as if it were in a free and uncombined state, but this depends entirely upon the indicator used to determine the end reaction, and the Pharmacopœia mentions no indicator. With phenolphthalein both molecules of acid can be completely and sharply titrated, exactly as if in the free state : this is a property common to most alkaloidal salts. Towards methyl orange quinine acid hydrochloride does not behave as a strong acid, and there is no definite end reaction, as the colour-change commences with the first addition of soda solution and is gradually completed during the titration. With litmus the results are more satisfactory, though by no means ideal, and the point at which one molecule of hydrochloric acid is neutralized can be observed fairly accurately ; it is necessary, however, to titrate until no shade of red is left and a full blue colour is obtained. One gramme of salt containing three molecules of water would require 2·2 c.c., and 1 Gm. of anhydrous salt 2·5 c.c., of N/1 soda. Here again, the absence of a minumum figure, and the use of the words " not more than " admit any salt from the one containing three molecules of water to the anhydrous. The use of N/1 soda is objectionable, the temporary precipitation of a considerable quantity of alkaloid tending to obscure the end reaction ; by the use of N/10 or N/5 soda this is avoided and more accurate readings can be obtained.

In the following experiments the total percentage of HCl in the anhydrous salt was ascertained by titration in alcoholic solution with N/10 soda, phenolphthalein being the indicator. The percentage of HCl indicated by litmus was next ascertained, and from this the percentage of acid hydrochloride was calculated. The percentage of HCl indicated by litmus was doubled and subtracted from the total percentage indicated by phenolphthalein (in an absolutely pure sample, obviously the two figures should be identical). The difference was regarded as HCl present in the original substance in the form of neutral hydrochloride, and the percentage of the latter was calculated. The results are tabulated :—

No. of Sample.	1.	2.	3.	4.	5.
Per cent. HCl in anhydrous salt by phenolphthalein .	18 3	18·5	13·8	16·0	16·3
Per cent. HCl in anhydrous salt by litmus (doubled) .	18·1	18·4	9·1	14·0	14·4
Per cent. differences between the two percentages of HCl (=HCl of neutral salt) . .	0·2	0 1	4 7	2·0	1·9
Per cent. anhydrous acid salt, calculated	98·4	100·0	49·4	76·9	78·2
Per cent. anhydrous neutral salt, calculated	2 0	1·0	46·5	19·8	18·8
Total per cent. of neutral and acid hydrochlorides . . .	100 4	101·0	95·9	96·7	97·0

Each sample on ignition yielded a negligible quantity of ash and, with the exception of No. 2, each contained appreciable traces of sulphates.

Nos. 1 and 2 may be regarded as satisfactory, whilst Nos. 3 and 5 appear to contain notable quantities of neutral hydrochloride. The sum of the percentages of acid and neutral hydrochlorides does not invariably add up to 100, and this may be attributed to the somewhat uncertain end reaction in the litmus titrations.

These experiments go to show—(1) That the quinine acid hydrochloride of commerce is practically an anhydrous salt, and does not contain the three molecules of water given in the pharmacopœial formula. (2) That the pharmacopœial tests for the presence of neutral hydrochloride should be made more precise, both maximum and minimum figures being given, with particular instructions as to the indicator to be used.

The President said that perhaps manufacturers sent out the anhydrous salt because it was of more constant composition than the hydrated salt, and more uniform dosage was thereby obtained.

Mr. **Harrison** said he had examined samples of most makers, both English and foreign, and in every case they were practically anhydrous, the highest percentage of water being about 2 per cent. A good method of determining the acid was to precipitate the alkaloid by the addition of excess of iodine, filter out an aliquot part, decolorise the filtrate with sodium thiosulphate, and titrate the free acid with standard alkali and methyl orange. Only one equivalent of acid was retained by the precipitate, any excess remaining in the liquid.

Mr. **Alcock** inquired if the percentage of anhydrous alkaloid in each of the samples had been determined, also if sample No. 3 had been tested for other cinchona alkaloids, because he could not reconcile the figures between the phenolphthalein and litmus indicators, seeing the others were in practical agreement.

Mr. D. **Lloyd Howard** said that some years ago there was on the market a salt containing three molecules of water; it had, however, a yellowish colour, whereas a less fully hydrated salt was white. He thought that in the case of sample No. 3, containing 46 per cent. of neutral salt, the solubility would throw some light on its nature.

Mr. **White** thought it would have been advantageous if Mr. Garsed had confirmed his figures by a silver determination of the chloride instead of relying upon somewhat uncertain titration figures.

Mr. **Garsed**, in replying, acknowledged the value of Mr. Harrison's method for the determination of the acid. He had not determined the amount of alkaloid in any of the samples. Sample No. 2, containing most water, was more free from colour than any of the others; No. 3 required about twenty parts of water at 20 to 25° C. for solution, thus giving some idea as to its nature. The other samples were all soluble 1 in 1.

NOTE ON THE ASH OF MYRRH.

By F. H. Alcock, F.I.C.

The determination of the amount of the ash of drugs has gained some prominence in pharmacy in recent years, and many results have been recorded before the Conference and in the journals by numerous workers. While looking through the literature of myrrh for the purposes of a paper which was read before one of our local pharmaceutical associations, not much could be gathered concerning the composition of the ash of myrrh.

Pereira in his classical work, states on the authority of Brande, and also Ruckholt, that " salts (benzoates, malates, phosphates, sulphates, and acetates of calcium and potassium) are present in the gum-resin myrrh to the extent of 1·36 per cent. (Brande) and 3·65 per cent. (Ruckholt)." Two other authorities Pereira quotes do not refer to the ash at all. Mr. Parker, in his paper on myrrh (1879), did not discuss this part of the subject, but alluded in a subsequent paper (1880), to the ash of " some spurious gums imported with myrrh," and stated that the ash of these consisted chiefly of calcic carbonate. An Edgbaston pharmacist, having supplied me with a large quantity of the gum left after making the tincture of myrrh, an opportunity was afforded of examining the composition of its ash. It required a preliminary treatment to remove the last traces of resin, which was found to be present to the extent of 1·1 per cent.

A qualitative examination showed that in addition to the calcium salts there was present a relatively large quantity of magnesium compounds. In order to determine the amount of the latter a quantitative examination was made, and, incidentally, the amount of a few of the other constituents was also determined. Twenty grammes of the resin-free and air-dried gum was incinerated, and yielded 1·263 Gm., or 6·315 per cent. of residue, which required for neutralization 23 7 c.c. N. hydrochloric-acid. The quantity of the ash which was insoluble in hydrochloric acid was 0 095 Gm., or 7·52 per cent., and the filtrate yielded 0·928 Gm. of calcium carbonate, or 73·47 per cent., whilst the magnesium was represented by 0·257 gm. of magnesium pyrophosphate, or 15·4 per cent. of magnesium carbonate. The remainder was made up of alkali, with the traces of other radicals. These results seem to show that the determination of the amount of magnesium salts in the ash of myrrh gum might prove to be an important test for admixed gums in genuine myrrh, especially when in the form of powder, in which state the amount of ash has been known to vary from 3·8 to 17 per cent. (Moor and Priest).

COMPOUND TINCTURE OF GENTIAN.

By F. H. Alcock, F.I.C.

Much has been written about this preparation, and whilst all workers are agreed upon the tests of gravity and alcoholic strength, there appears much diversity of opinion about the percentage of total solids. Reference to published statements shows that, broadly speaking, the wholesaler's standard is somewhat higher than that of the retailer

The late Mr. John Barclay in 1898 suggested a 5 per cent. w/v standard; Messrs. Moor and Priest (1900) found 5·2 per cent.; Mr. J. C. Umney (1902) gives 5·5 per cent., and Mr. Wippell Gadd (1904) states an average of 5·33 per cent., the maximum being 6·13 per cent., and the minimum 3·76 per cent. On the other side, Mr. P. Boa records 4·603 per cent., and another —but this after twenty-four hours' maceration only—4·433 per cent. Mr. Perry, my fellow-townsman, has shown that when carefully prepared with good commercial specimens of the ingredients, the percentage of solids did not exceed 4·5; and a sample of my neighbour's make gave 4·55. My own experience is equally varied; at one time samples submitted to me for examination gave 5·2 per cent., and at another fell as low as 4·6 per cent; other figures being 4·82 per cent. and 4·78 per cent. All these were prepared by retailers. To locate the cause, a few experiments were made, the results of which it was suggested might interest the Conference. A quart batch was made in accordance with official instructions, and at the end of the prescribed period of maceration 10 c.c. was evaporated in a flat-bottomed platinum dish, and yielded 0·46 Gm. of solids. Eight days afterwards 10 c.c. gave 0·482 Gm. and the same batch, which had not been removed from the marc, and had been daily shaken, after standing in my laboratory three and a half months gave 0·478 Gm. from 10 c.c. A simple tincture of each ingredient prepared of official strength was then made, these being taken from the same stock as those used in the above experiment, but with a difference in the method of disintegration. Each was passed through an ordinary household coffee-mill, the product resembling in coarseness that of ordinary ground coffee. The simple tincture of cardamoms yielded 0·004 Gm. per 10 c.c. That of the orange, which was the English cut variety, although from Mr. Perry's experiment it would seem that whether the English or foreign cut article was used does not materially affect the product as far as the percentage of solids is concerned—10 c.c. gave 0·135 Gm. of solids. That of the gentian was 0·415 Gm. from 10 c.c. Each was examined again at the end of a month, and the same figures were again obtained. Assuming that when together the same quantity of soluble matters would have been taken up by the solvent, then 10 c.c. would have given 0·554 Gm., which accords more with what I have called the wholesalers' standard. The amount derived from the cardamoms may be neglected, and I find the orange is fairly concordant in the yield of solids; and it seems clear to me that the gentian is the cause of the variation. An examination of commercial gentian convinces me that its careful selection is needed if concordant results are to be obtained, and some better recommendations for disintegration are necessary. Powdered gentian, unless guaranteed, should not be used, for recent revelations show this to be of doubtful purity, and only high-class specimens should be used, for which a good price will be asked.

Mr. BIRD said the paper on compound tincture of gentian was very useful at the present moment, as a short time ago there was much difficulty in reaching a 5 per cent standard, and he had concluded that the gentian was the real cause. The difference in the results of retailers and wholesalers was probably a mere coincidence.

Mr. RUTHERFORD HILL said that the materials that had been used by Mr. Boa were of first-class quality, but he found the gentian was the source of variation. Mr. Boa's results were given as weight in weight percentages and Mr. Alcock's as weight in volume. If this is taken into account their results are almost indentical.

Mr. UMNEY pointed out that the 200 samples examined for the Local Government Board of Ireland, given in Mr. Brunker's paper, had an average extractive of 5·4.

Mr. FARR bore out the statement that gentian varies. There is a considerable difference in the extractive of the large and the small pieces, being higher in the large, but the small have more aroma and bitterness, so that the extractive is not a measure of activity.

Mr. WHITE asked why the theoretical amount of extractive is greater than that actually found in Mr. Alcock's experiments.

Mr. MERSON said he had found that the ash of genuine myrrh was practically entirely soluble in dilute hydrochloric acid.

Mr. ALCOCK, in replying, said he was glad to find so much unanimity as to the cause of the variation of the total solids of Tr. Gent. Co., and explained the variation referred to by Mr.

White as being due to a difference in the state of disintegration of the drugs. The difference in the solubility of the ash of myrrh in hydrochloric acid was not due to any error of experiment, but to the difference in the samples of drugs each had experimented with.

—

THE FLORA OF SUSSEX.

By G. Claridge Druce, M.A., F.L.S.

To have a rich and representative flora certain physical characteristics are necessary. One must have soils of various kinds at various altitudes. These should be well wooded regions, alternations of porous soil and impervious strata, and, if possible, an extensive sea-coast. All these characteristics Sussex possessed, and its flora was, therefore, one of the richest of the Southern counties. If they visited the extreme east in the neighbourhood of Rye or Winchelsea, once maritime, but now inland, towns —where many of the members of the Conference would remember Mr. Wm. Martindale, of whom they were all so proud, resided —they would observe the rich growth of *Althæa*—marshmallow —which adorns the trenches in that neighbourhood. At Tunbridge, on the picturesque rocks, grows the small fern named after it—*Hymenophyllum tunbridgense*. At Hastings, on the rock, *Matthiola* grows in great profusion, although the *Flora of Sussex* stated that it was extinct. And on the same rock a small lotus, *Lotus angustissimus*—has been found. Coming nearer Brighton, at Eastbourne, a district which has been so well worked by Mr. F. C. Roper, a small umbelliferous plant, *Bupleurum aristatum*, grew in the short turf, Devonshire being its only other British locality. On the Downs between Eastbourne and Newhaven another umbelliferous plant, *Seseli libanotis*, occurs in great quantity. Missing large areas of country it reappears in Cambridgeshire and Herts. In the picturesque Cuckmere Valley the small Gentianceous plant, *Erythræa capitata*, occurs, and at the ruins at Hurstmonceux Castle in the marsh grows the rare sulphur wort or milk parsley, *Peucedanum palustre*, which he discovered recently with Mr. Hilton growing with the reed grass, *Calamagrostis lanceolata*. Chailey Common has a pale flowered violet *Viola lactea*, the rare sedge *Carex montana*, and the thrum-wort, *Damasonium alisma*. On the Downs near *Brighton* occurs *Silene dubia*, found also at Dungeness, in Kent, and Mr. Hilton has recently found a new British grass, *Festuca ciliata*. On the shingle at Shoreham the curious clover, *Trifolium stellatum*, occurs in its only permanent British locality. At Arundel, in the beautiful and extensive park which the members of the Conference were to visit on Thursday, grows the bear's-foot, *Helleborus fœtidus*, which was discovered there by the great botanist John Ray; and there too grows the white mullein, *Verbascum lychnitis*, the belladonna, the spurge laurel (*Daphne laureola*), and other medicinal plants. In the woods of the district *Daphne mezereum* has been found as a hybrid, it is said, of the two species. The spiked Star of Bethlehem, *Ornithogalum pyrenaicum*, also occurs. The cranberry, *Oxycoccus quadripetala*, was formerly so abundant in the once extensive marsh district known as the Wild Brooks of Amberley, that the fruit was sold at 1*s*. per quart, but drainage has now nearly extirpated it. In the sluggish water-channels the rare pond weed, *Potamogeton acutifolius*, still grows; and in this district the late Mr. Borrer discovered the curious rice-like grass, *Homalocenchrus oryzoides*. Near here, too, grows the smallest British plant, the tiny *Wolfia arrhiza*, the whole plant of which is not much larger than a grain of sand. At Selsey Island, in the extreme west of the county, a rich variety of maritime plants are found, and the tidal banks of the Arun afford *Scirpus carinatus* and *S. triqueter*. It was necessary to mention in eulogistic terms the labours of Mr. Wm. Mitten, of Hurstpierpoint, who not only carried out the duties of a country pharmacist, but enriched botanical literature with contributions to the flora of his county, and laid the scientific world under obligation by his monograph on the mosses of British India.

The PRESIDENT said Mr. Druce's botanical sketches were always most fascinating, and they all regretted that he was not able to extend his address beyond the ten minutes allotted to him.

Mr. J. W. WHITE moved that a vote of thanks be accorded to Mr. Druce for his address. He was not entirely a stranger in this part of the country, and he believed there were many plants existing in Sussex which were difficult to find in other places. He referred to the brambles, and said there were a dozen or fifteen uncommon species to be found in Sussex.

Mr. E. H. FARR seconded the vote of thanks to Mr. Druce, who, he said, had a wonderful knowledge of local botany. He had mentioned the name of Mr. Hilton, whose knowledge of the Sussex flora was absolutely unique, and he could quite understand

Mr. Druce knowing where to find nearly everything if he had been associated with Mr. Hilton. There were two species of *Phyteuma* in Sussex, one of which, *P. spicatum*, grows in a few localities as well as the hairy spurge, *Euphorbia pilosa*, which occurred near the district known as Chailey Common, and also on the borders of Ashdown Forest. The latter was a new locality which had only recently been discovered, but the plant was not common now. With regard to the Rubi, a large number of species had been found in Sussex which had not previously been recorded for the county. Mr. Hilton discovered a number, and he (Mr. Farr) had discovered several different species.

Mr. E. W. POLLARD said *Matthiola* was formerly somewhat rare in the Isle of Wight, being found only on the cliffs at Freshwater, but now it was extending to Ventnor. He would like to ask how many species of orchids have been recorded for Sussex. The Isle of Wight had twenty-eight and Hampshire twenty-three. In the Isle of Wight they had soil of different formations, and each formation had its own plants. He believed two species of *Rhamnus* occurred in Sussex.

Mr. CRIPPS said those who visited Arundel would find the marshmallow growing there and also a profusion of belladonna.

Mr. J. R. HILL said it was always delightful to listen to Mr. Druce on botany, and he might say that in Scotland, if any critical question arose as to the identification of any plant, Mr. Druce was referred to. His (Mr. Hill's) opportunities of studying the flora of Sussex were almost confined to looking out of the window of the Brighton express, but what he saw convinced him that nothing could be more delightful than a trip through Sussex with Mr. Druce. He might mention that two men in the county of Midlothian had recently directed their attention to the railway embankments, and had discovered 100 alien plants growing there. He thought, if an examination of the railway embankments of Sussex were made, some interesting discoveries of alien plants would result.

Mr. DRUCE, in reply, said it was stated in Dr. Arnold's *Flora of Sussex* that *Phyteuma spicatum* had been known as a Sussex plant since 1634, when it was recorded in Johnson's *Gerarde*, and was not known to occur with certainty in any other British county. With regard to the number of species of plants, he ought to have have said that Sussex compared favourably with any other county, from 1,100 to 1,150 different species being found in the whole county. There were twenty-eight species of orchids in

Sussex, of which two were very interesting. The first, *Malaxis paludosa*, growing upon the sphagnum moss in marshy places, has been found in Ashdown Forest, and the other, *Habenaria albida*, which was not infrequent in Scotland, but very rare in the South, had been found on the chalk Downs. With reference to Mr. Hill's remarks, he might say that recently, during an hour's railway journey to Roxburgh, he was able to count 200 species —not of aliens but of natives—on the railway embankments and cuttings.

FURTHER NOTES ON RADIO-ACTIVITY.

BY W. HARRISON MARTINDALE, PH.D. (MARBURG).

The literature on the subject of radio-activity has increased in volume enormously. In 1896 there appeared seven papers on radio-activity; in 1897, six; in 1899, eighteen; in 1900, thirty-nine; in 1901, thirty-six; in 1902, forty-one; in 1903, ninety; and in 1904 and 1905 upwards of 500 have been published, the majority of which have been worthy of consideration.

It is now, I believe, pretty well agreed that the successive decomposition[1] of the element uranium is represented by the following summary:—

U → UX → Ra → Ra Emanation → Emanation X → He.

The uranium X, radium emanation and the emanation X transform so rapidly that only very small amounts of them are found in minerals. Uranium separated from uranium X reaches its one-half value again in twenty-two days. The disintegration theory has received great elaboration, notably at the hands of Rutherford, who describes radium, A, B, and C—the last-mentioned falling into α, β, γ rays. There is, further, radium D and E—the E body being evidently identical with polonium.

A slight correction should here be mentioned. I stated last year that Professor Soddy had announced that the radium observed to be produced by uranium was less than $\frac{1}{10000}$ of the amount demanded by theory—he has now modified it to $\frac{1}{500}$, and explains that the error in the previous result was due to radium-infection of the laboratory. The too low rate of production will in all probability be explained at a later date as experiments are being conducted[2] with a view to elucidating the discrepancy.

---

[1] *Chemical News*, 1904, 200.

[2] *Nature*, January, 1905, p. 294.

It is a significant fact that radio-activity is of the same magnitude whether the substance be in the solid condition or diffused throughout a solution more than 1,000 times the volume of the radio-active solid taken.

Quinine sulphate in solution has been found to give a radiation possibly caused by very short waves of ultra-violet light, such as are present in ionizing gases—it is quite distinct from a radio-active substance.

Some work conducted at Issy l'Evêque is claimed to prove that radium occurs in lead-bearing soils unaccompanied by uranium.

The breaking up of the radium atom produces evidently a very considerable yield of energy—this suggested that it might be possible by imparting sufficient energy to change the atoms into a more complex condition. The question of the coloration of glass by radium has received some attention. The products of the emanation have the greatest power in this direction. A solution of radium bromide in a vessel half full of the liquid does not colour the glass to such an extent as the radio-active deposits of the gas above it. It is apparently the work of the β rays—soda glass is turned violet, potash brown. Manganese is, however, usually stated to be responsible for the violet colour. Gold glass is turned pink, copper glass red, silver glass yellow, and so on. The plus ions of the metals are said to be neutralized by the β electrons, with the result that the metal ions are thrown out. Silica as such, not being a salt, contains no ions and is not affected by the emanation. The radio-activity of the glass thus caused by direct contact of the emanation is capable of being removed by washing, but the colour remains. The water thus used when freed from emanation still gives active precipitates with mercury compounds. The mercury must be distilled off and further examination of the residue conducted. The coloration has been suggested as a means of estimating activity. It was found that a special type of boro-silicate crown glass was easily coloured by a small amount of radium in twenty minutes—a scale on these lines could be arranged.

The radiation from hydrogen peroxide will affect a photographic plate—objects not being in the direct line between the H_2O_2 and the plane appear as pictures. An object placed between a glass plate on which is placed a sensitive film is photographed by the rays coming from the H_2O_2 situated on the film side—this seems remarkable—metals placed on the far side away from the radiation appear bright on a dark ground. This effect is either due to ozone or to differences in temperature. It is noteworthy that in all these effects a reversal may take place after ten minutes or so of exposure.

It has been frequently observed that glass tubes containing radium will crack spontaneously—the effect is due to difference in potential caused by the retention of the + charged particle on the inside of the tube, and must amount to some thousands of volts.

The zinc blende employed in the spinthariscope effect is not so responsive to the radiation when cooled to the temperature of liquid hydrogen, though, of course, the radiation from the radium is just as active at this temperature. It has been determined that 0.291 per cent. of the total radiation from radium passing through 3Mm. of lead is β radiation of the highest velocity.

Some solutions were obtained by Ramsay and Cooke in some work on the chemical properties of the β and γ rays, containing a radio-active substance which could sometimes be removed by formation of a precipitate in the solution. A solution of this kind, in which precipitation had already taken place, was found to contain a body which could lessen the rate of leak of the electroscope—it was, indeed, an anti-activity. As to the explanation, Cooke suggests either that the leaf of the electroscope, which was always negatively charged, receives particles carrying a similar charge, which particles cause little ionization of the air, or that the rays exert a de-ionizing power on the air, if one can conceive such an action.[1]

The γ rays, which have their source in the atom of the radioactive substance at the moment of expulsion of the β particle, produce an ionization of the air about equal to that effected by the β particle. They have a velocity approaching that of light. The velocity of the β rays in Kaufman's determinations was found to be within 6 per cent. of that of light.

The mineral kunzite, which is very responsive to this radiation, shows the property of thermo-luminescence; the radium effect with it is, however, not instantaneous. On the contrary, it is a cumulative one; radium emanation condensed (it does so at a temperature − 147°) on to the crystals by liquid air produces no phosphorescence.

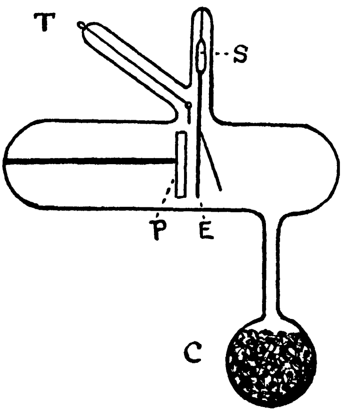
[1] *Nature*, 1904, 170.

Paschen Phys. Zeitschrift, 5 Jahr, No. 6, p. 160,

DELTA RAYS.

The delta ray consists of negatively charged particles travelling at a velocity about one-fiftieth of that of the beta particle. This ray is, therefore, not very penetrating ; it is, in fact, stopped by as small an amount as 2 Mm. air. It is given off by a number of substances, e.g., by an alloy of sodium and potassium, also by rubidium, or, rather, by the sublimate obtained by warming rubidium in a vacuum tube.

Polonium has been proved to give off delta rays in addition to the plus charged alpha rays. These two electricities tend to neutralize each other, but the negative delta rays may be deviated by a magnet—then the alpha ray, having a greater mass, is only slightly bent, and the deviation is in the opposite direction. The alpha ray is now free to discharge the electroscope, which has been negatively charged.



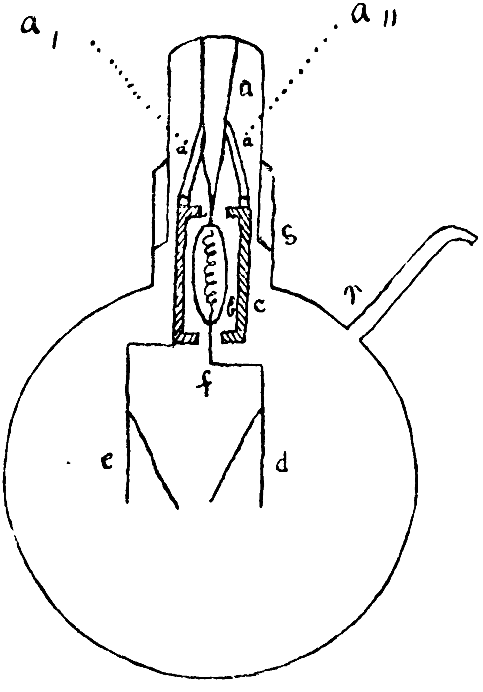
The diagram here shows the construction of the apparatus necessary—a vacuum tube with a charcoal bulb (*c*) is cooled by liquid air producing a high vacuum. "E" is the electroscope, supported by an insulating bead (S). It is charged at "T," the attachment at the end of the terminal. It is a movable piece of iron wire, which, for charging up, can be brought in contact with the electroscope by moving a magnet. A negative charge is communicated and the plus and minus radiations from the polonium do not discharge the electroscope unless in a magnet field at right angles to the plane of the diagram—the negative delta-rays being deviated, as already mentioned, are prevented from crossing the space between "P" and "E," and the remaining plus rays have the power now to discharge it.

Professor Thompson has proved, by examining a large series of substances from different parts of the world, that this inherent radio-activity in such substances as aluminium and copper is not due to radium as impurity, as the leak from each series of substances is of the same kind and of about the same magnitude.

A New Radium Electroscope.

Paschen has arranged an electroscope, or "radium clock," to show the β radiation in addition to the a.

Two quartz rods, a_1 and a_{11}, annealed on to a, support a hollow box, c, of 2 Mm. width, in the wall. It is completely isolated from a glass vessel b, in which there is a platinum spiral, coated with the radium salt. This is connected with the electroscope d. The second electroscope e is connected with the lead box. Both electroscopes diverge as soon as there is a good vacuum, d with positive electricity, and e with negative. Bringing negative electricity above, so as, by influence, to produce negative electricity at the point of the supports, causes the divergence at e to be increased and that at d to be lessened. The opposite takes place on bringing a positive charge to the apparatus.



Additional platinum wires can be arranged which can be made to touch either of the electroscopes and carry the charge in question away. It is also possible to determine the charge passing from the inside of the glass vessel to the lead box when these are connected.

The divergence of *e* is always smaller than that in *d*, principally due to the fact that the absorption of the β rays is not complete by 2 Mm. of lead. The leaves meet in an hour and neutralize the charges of their conductors, but this neutralization is not a complete one—both electroscopes have a small + charge, i.e. *b* holds back more + electricity than *c* absorbs in the way of negative charge of β electrons.

Perhaps the latest thing in radio-activity—in the daily papers—is the production of bacterial life by radium.

HEAT EVOLUTION.

The heat evolution from radium is taken to be 100 Gm. calories per Gm. per hour. After being heated the radium yields only 25 per cent. of its original heating power, the remaining 75 per cent. having been driven off with the emanation. I may add that Dobelle, in Paris, has observed what is possibly an atomic breaking up of sulphur, i.e., he found that on keeping two thermometers in a constant temperature, one of which is coated with flowers of sulphur, this one always registered about 2° lower than the other. Some substances, however, have the opposite effect.

Observations have been made on minute specks of radium bromide heated on the platinum ribbon of the meldometer, proving that its melting-point is 728° C.

It was stated by one authority that 50 per cent. of the heat emission was due to the γ ray.

On the other hand, three successive stages of excited activity changing into each other have been demonstrated by Rutherford, and as it takes half an hour for the full heating effect to be shown by thermo-electric junction, it is assumed that the heat is set free at a late or final transformation.

RADIUM EMANATION.

The radium emanation cooled by liquid air commences to volatilise at $-150°$ C. When kept under observation for a month it was found to be rather erratic. I refer to Ramsay's small quantity kept in a minute vacuum-tube—it seemed to have the annoying power of disappearing and reappearing. However, the conclusion was ultimately drawn that in 3·7 days the amount of luminous gas was only half its original size, and in thirty days it was only the smallest pin-point in the tube. One hundred parts of radium emanation changed into 3½ parts of helium. The question as yet unsettled is, What becomes of the remainder ?

The emanation is being continually produced by radium in solution ; the part above the solution is distinctly luminous, whereas the radium solution is not. In addition to this production of emanation by radium there is a continuous breakdown of the emanation ; it falls to half value in about four days, and is, practically speaking, nil in thirty days, as already mentioned.

Taking into account the respective rates of decay of the emanations, it is easy by this means also to determine the radioactive constituents of minerals The emanation is driven off, by heat and kept under observation for a time ; those, for example, of thorium and radium, the most frequently to be searched for, are easily distinguished.

On injecting a solution of radium hypodermically it may be argued that the radium will continue to generate emanation in the tissues and thus prove of permanent value in arresting the progress of malignant growths. I have some specimens of urine taken from cases after radium injections at intervals of one hour (No. 1), six hours (No. 2), twelve hours (No. 3), and twenty-four hours (No. 4). The strength of the injection suggested has been 1 Mgm. dissolved in 10 c.c. of sterile water —the average dose being 1 c.c. = $\frac{1}{10}$ Mgm. All of these specimens of urine show a very slight radio-activity.

Mr. Glew has very kindly estimated the radio-activity of these specimens for me, and gives the following figures :—

RADIO-ACTIVITY OF URINE.

No.	Scale Divisions.	Minutes.
1	3	21½
2	3	22
3	3	33
4	3	40

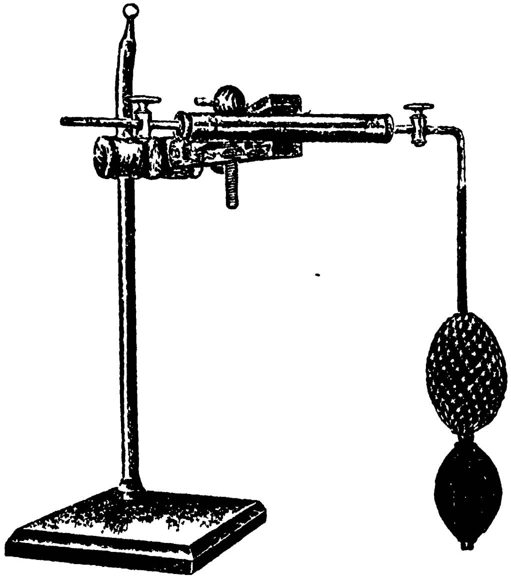
Eight oz. of urine were in each case provided, and the above figures were obtained by testing the residue on evaporating half of each specimen, i.e., 4 oz. to dryness.

The first actual injection of radium bromide was, I believe, conducted by Mackenzie Davidson, who employed this quantity, $\frac{1}{10}$ Mgm.

The employment of radium emanation has been suggested instead of the rays, and is in reality analogous with the use of morphine instead of opium, i.e., radium as such gives off

α, β and γ rays, and the emanation at the moment it is liberated is, as it were, the active principle giving off the same radiations. A method of administering the emanation will have to be devised. It should be recollected that the emanation is particularly soluble in toluol.

The emanation behaves as a gas of the argon family, but without chemical activity; it is self-luminous, and follows Boyle's law; it is probably monatomic with a density about 80 and atomic weight 160. It follows from the kinetic theory of gases that the internal energy of the atom is independent of the temperature. Experimental proof is present in case of the radium emanation in which the activity is the same for such extremes as −180° C. and +450° C.



Celluloid rods, plates, etc., may be coated with radium by means of amyl acetate, alcohol, etc. These solvents attack the celluloid slightly, making the radium adherent. This done the instruments are varnished with collodion to protect the layer. It is a good plan to colour both the radium solution and the collodion so as to be sure that the radium is actually adherent. Similarly, all ordinary surgical instruments may be coated, and as the coating is capable of being boiled, such instruments are sterilisable. A celluloid tube may be coated in this way (see wood-cut), on its inner surface, etc., being provided with stopcocks at each end and a rubber bellows and tube. The rays can thus be blown into the patient's lungs, or they can be injected into the seat of a tumour or blown over the surface of it.[1] The above is particularly useful for employing the α-radiation. A rod, as first mentioned, thus tipped with 10,000 activity radium, is said to be electroscopically equal to 1 Gm. of radium in a glass tube or to 10 Mgm. of 1,000,000 activity in a thin aluminium tube, though this seems an exaggeration. It is worthy of recollection that surgical instruments can be rendered active in this way by inducing a secondary radiation by proximity with radium.

OTHER RADIO-ACTIVE SALTS.

In view of the almost prohibitive value of radium now it would seem desirable to pay more attention to the comparatively cheap radio-active uranium and thorium compounds.

I may remind you of the fact that uranium is separated by ether solution into uranium, giving α rays only, and uranium X, giving β rays only—the inactive goes into the ether—or the small amount of the uranium X may be separated by means of ammonium carbonate, in which it is insoluble. It gives off only β-radiation and there is a state of balance between the amount of uranium X losing its activity and the amount that is regenerated. Similarly thorium X has 75 per cent. of the α and all the β rays—the insoluble thorium hydroxide shows 25 per cent. of the α and no β radiation. This thorium X produces a very flighty emanation—falling to half value in fifty-five seconds, i.e., in two minutes it is only quarter value, in three minutes it is one-eighth value, and so on. It volatilises and can be condensed at 120° C. A metal plate exposed to thorium emanation a short time only becomes active, and the activity increases first after removal, reaches maximum in one hour and then decays at the same rate as for a long exposure; this is explained by supposing two changes to take place, the first produces no rays, the second produces rays capable of ionizing the gas.

The thorium hydroxide of commerce is usually found to be very active—considerably more so than the nitrate. I have been preparing a number of organic salts of thorium. Dr. Morgan[2] has very nearly exhausted the series of possible medicinally useful ones, and I am much indebted to him for the hints which he has given me in the matter. Of the following the salicylate, cinnamate, or thocoumarate, oleate, lactate, sulphocarbolate, and camphor sulphonate are included in a provisional patent taken out by him, No. 11,349, May 17, 1904, and a registration of a trade mark for same is proceeding.

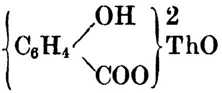
---

[1] *Pharm. Zeitung*, June 21, 1905, 517.

[2] *P. J.*, ii., 1904, 472.

THORIUM SALICYLATE.

This salt is a basic one apparently having the formula—



$$\left\{ C_6H_4 \begin{array}{l} \diagup OH \\ \diagdown COO \end{array} \right\}^{2} ThO$$

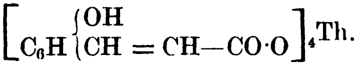
It is prepared by precipitating thorium nitrate with sodium salicylate. The precipitate is washed with warm water till free from sodium nitrate, and carefully dried. It contains 48 per cent. ThO_2, and is a white, insoluble powder.

THORIUM CINNAMATE.

$$(C_6H_5-CH = CH-COO)_4Th.$$

Thorium cinnamate is made by treating sodium cinnamate with thorium nitrate. It contains 38 per cent. ThO_2,

THORIUM ORTHO-COUMARATE.



$$\left[C_6H \left\{ \begin{array}{l} OH \\ CH = CH-CO\cdot O \end{array} \right. \right]_4 Th.$$

This body is prepared also by double decomposition. The first step is to prepare the coumaric acid; for this, one hydrolizes 10 parts of coumarin with a solution of 3·5 parts of sodium in 65 parts of absolute alcohol. It is necessary to heat for one and a half hours on the water-bath. The solution is then diluted with water and evaporated to small bulk. The acid is liberated by means of dilute hydrochloric acid. It is removed and dissolved in sodium carbonate. The sodium salt in solution is then freed from coumarin by shaking with ether (there is always a good deal of coumarin unattacked which can be recovered in this way, and used up again in further batches). The acid is then thrown out again with a little dilute hydrochloric acid, and may, if desired, be purified by recrystallization from alcohol. My experiments have indicated that this further step is hardly necessary.

THORIUM OLEATE.

This is an interesting body. 298 of hydroxide will interact with approximately 1,120 of oleic acid. A little ether added to dissolve the oleic acid is a useful adjuvant. The salt is at first pasty, and becomes hard ultimately. It is suggested for use in the form of an ointment with paraffin basis. I show one made of 10 per cent. oleate strength.

THORIUM LACTATE.

The lactate is made by interacting on freshly precipitated hydroxide with lactic acid. It is a crystalline salt, very soluble in water and permanent in air.

THORIUM SULPHOCARBOLATE.

Syn., Thorium Para-Phenyl-Sulphonate.

Para-phenyl-sulphonic acid will combine with thorium hydroxide. The salt may be recrystallized from water, but my experience is, that on endeavouring to redissolve the crude crystals in plain water, some basic salt may be formed which is difficult to get into solution—a slight excess of acid is therefore essential.

THORIUM CAMPHOR-SULPHONATE.

$Th(C_{10}H_{15}O{\cdot}SO_3)_4{\cdot}9H_2O$.

The camphor-sulphonic acid necessary is prepared by acting upon 152 of camphor (in solution in acetic anhydride) with 98 of sulphuric acid, producing theoretically, 232 of camphor-sulphonic acid. This quantity requires, theoretically, 74½ of thorium hydroxide for saturation. Well defined crystals can be prepared.

THORIUM GLYCEROPHOSPHATE.

To prepare this compound, the only satisfactory way of proceeding seems to be to react upon the nitrate with sodium glycerophosphate in solution.

It is necessary to work in concentrated solution, as the salt is a soluble one. To work from the hydroxide and glycerophosphoric acid does not commend itself from the point of view of the possible splitting up of the acidic radical into glycerin and phosphoric acid on evaporating the acid solution.

THORIUM QUINATE.

This I have prepared by treating the hydroxide (freshly precipitated) with quinic acid.

I have been unsuccessful in obtaining the salt in crystalline form, but scales are easily obtained which are soluble in water.

THORIUM ACID URATE.

This I have prepared by double decomposition of sodium biurate with thorium nitrate. The sodium biurate, $C_5H_3NaN_4O_3$, may be made by neutralizing uric acid with sodium carbonate.

Mr. Glew has determined the relative radio-activity of many, and gives the following electroscopic figures. It should be mentioned that several of these salts had adherent moisture, and were more recently prepared than others.

	Scale Division.	Minutes.
Thorium lactate	3	3½
Thorium hydrate (moist)	3	5
Thorium sulphocarb	3	6
Thorium salicylate	3	7
Thorium oleate	3	15
Thorium coumarate	3	15
Thorium acid urate	3	16
Thorium cinnamate	3	19

He has also prepared for me some excellent photographs showing the activity of these compounds, and a very interesting one proving the secondary radiation produced by radium in a sheet of platinum.

The insoluble thorium salts, e.g., the hydroxide, may be made into pads for local treatment—the rays being employed in nerve diseases. I am showing pads of this description for use on the head, spine, etc. A medical man tells me that thorium radiation thus used appears to have exerted a beneficial influence in a case of paralysis.

Dr. ATTFIELD, who occupied the chair during the reading of this paper, said a very interesting subject had been handled in an extremely interesting manner. Dr. Martindale's remarks and the objects he had shown would stimulate pharmacists to investigate the matter for themselves.

AN EXAMINATION OF SOME COMMERCIAL "CONCENTRATED INFUSIONS."

By R. A. Cripps, F.I.C.,
Public Analyst for Bournemouth.

The so-called "concentrated infusions" have now been in use a great many years, and notwithstanding the fact that in the Pharmacopœias of 1885 and 1898 the inducement for their use was greatly lessened by the shortened periods of infusion ordered, they still remain in great demand ; in fact, it is probable that the freshly made infusions are used in fewer pharmacies to-day than at any previous time. The concentrated solutions of the 1898 Pharmacopœia are scarcely at all used, which is no matter of surprise, for obvious reasons.

I feel that some apology is due for bringing forward a subject which has already been written upon by many pharmacists ; but I consider the importance of knowing how far we may trust the concentrated preparations of commerce as representative of the fresh infusions to be sufficient reason for so doing, especially as nearly all previous communications on the subject have contained little or no reference to the important matters of aroma, colour, and flavour, attention having been almost confined to the determination of alcoholic strength and "extractive."

In the accompanying tables I have given the results obtained from eight samples of each of the following "concentrated infusions" : calumba, cascarilla, gentian, cinchona, and quassia showing total solids, alcohol, aroma, colour, taste, and, in the case of cascarilla, "bitter resin," and of cinchona "total alkaloids." The samples were obtained from London wholesale firms of good repute, with the exception of the series No. 8, which comprised preparations made by myself by methods generally similar to those referred to by me in a paper read before the C.A.A. of London, and published in the *P.J.*, July 14, 1895, except that the Inf. Calumb. Conc. was made by maceration and pressure instead of repercolation, and series No. 4, which was supplied by a firm of "cutters."

The process adopted for determination of alkaloids in Inf. Cinchon. Acid. Conc. was the usual one with benzolated amyl alcohol, as used for Tinct. Cinchonæ ; the determination of crude bitter principle in Cascarilla was as follows : 20 c.c. of the liquid was evaporated to dryness, 1 Gm. of finely powdered pumice being first added ; the dry residue finely powdered, and exhausted by successive extraction with chloroform and filtration; the chloroform distilled off and the residue weighed.

The results of examination for odour, etc., are expressed in the table by numbers, the fresh infusion being expressed as "1," and the lower numbers being those most nearly resembling the fresh, the highest numbers being usually very far from this ideal.

TABLE 1.—INF. CALUMBÆ CONC.

No. of Series.	Specific Gravity.	Extractive in 100 c.c.	Alcohol by Weight.	Colour.	Taste.
1	988·0	2·76	17·34	9	8
2	990·0	2·32	17·89	4	7
3	989·5	1·87	13·17	7	8
4	997·5	2·67	9·45	5	5
5	988·0	2·96	16·8	7	5
6	990·5	3·3	17·34	6	4
7	991·7	2·63	13·36	2	3
8	996·8	3·14	13·38	2	1
Fresh . .	—	×8=3·45	—	1	1

NOTES ON TABLE 1.

(*a*) There is no relation between alcoholic strength and "extractive."

(*b*) With exception of No. 3, none of the samples showed any *great* deficiency of total solids; No. 8 being made from the same parcel of root as the fresh, the deficiency of 0·31 per cent. may fairly be assumed to be due to albuminous matter precipitated by the alcohol.

(*c*) Colour.—Nos. 7 and 8 were very near to the fresh infusion, Nos. 3, 5 and 1 were very dark and quite unlike the fresh.

(*d*) Taste.—Solids and bitterness evidently bear very little relation, *vide* samples 1 and 3, both of which were *very* poor samples.

TABLE 2.— INFUS. CASCARILLÆ CONC.

No of Series.	Sp. Gravity.	Extractive.	Alcohol by weight.	Crude Bitter Principle.	Colour.	Appearance.	Odour.	Taste.
1. . .	984·5	1·51	15·13	0·058	6	clear	9	8
2. . .	1000·0	4·03	8·98	0·245	3	nearly clear	5	3
3. . .	986·0	1·57	12·38	0·035	1	nearly clear	4	5
4. . .	992·5	1·87	9·93	0·057	7	clear	7	4
5. . .	982·0	1·83	16·8	0·060	3	nearly clear	6	7
6. . .	981·5	2·76	18·4	0·065	5	clear	8	6
7. . .	981·0	1·40	18·4	0·035	9	nearly clear	3	9
8. . .	983·5	3·58	17·88	0·60	7	cloudy	2	2
Fresh .	—	×8=5·8	—	×8=0·74	1	cloudy	1	1

NOTES ON TABLE 2.

(*a*) With the exception of No. 8, not one of these preparations could be said to have any pretensions to representation of fresh infusion.

(*b*) Colour.—All were paler than the fresh, except Nos. 2 and 3.

TABLE 3.—INF. CINCHON. ACID. CONC.

No. of Series.	Specific Gravity.	Extractive.	Alcohol by Weight.	Alkaloids.	Odour.	Appearance. (Conc.)
1. . .	1001·5	5·8	12·18	0·81	3	cloudy
2. . .	969·0	8·68	35·2	0·515	6	clear
3. . .	966·5	4·56	30·9	0·23	5	nearly clear
4. . .	1020·0	—	9·0	0·335	9	slightly cloudy
5. . .	999·0	7·42	18·4	0·46	6	slightly cloudy
6. . .	1007·5	6·46	11·9	0·54	8	slightly cloudy
7. . .	1002·5	7·34	16·3	0·425	2	nearly clear
8. . .	1046·0	—	11·0	1·38	4	nearly clear
Fresh .	—	×8=10·4	—	×8=1·52	1	opalescent

NOTES ON TABLE 3.

(*a*) Extractive.—Nos. 4 and 8 contained glycerin, hence extractive could not be determined readily; except Nos. 1 and 3 the proportions present were fairly good.

(*b*) Alkaloids.—None of the samples contained any reasonable proportion.

(*c*) Odour.—Some of the samples had scarcely any aroma of cinnamon or ginger.

(*d*) Appearance.—The table gives the character of concentrated preparations; when diluted they varied greatly. Nos. 2 and 3 had heavy deposits, which settled down on standing, others much less; the *fresh* infusion was turbid throughout; the turbidity *not* settling out on standing.

(*e*) I could get no satisfactory results by taste.

TABLE 4.—INF. GENTIAN CO. CONC.

No. of Series.	Specific Gravity.	Extractive.	Alcohol by Weight.	Colour.	Aroma.	Taste.
1. . . .	1004·5	8·0	17·34	5	5	5
2. . . .	995·5	3·64	11·20	7	6	7
3. . . .	1000·0	4·38	9·93	8	7	8
4. . . .	998·0	4·06	9·93	5	8	5
5. . . .	991·0	3·46	13·89	4	4	4
6. . . .	999·0	5·31	15·13	9	9	9
7. . . .	996·5	4·35	13·89	2	3	3
8. . . .	1008·5	7·84	12·88	1	2	2
Fresh . .	—	×8=9·2	—	1	1	1

NOTES ON TABLE 4.

(*a*) Again, alcoholic strength bears no apparent relation to total extractive.

(*b*) It is not easy to understand why Nos. 2, 3, and 4 of low alcoholic strength should also contain so little "solids."

(*c*) Such variation in extractive is, in my opinion, quite unnecessary.

(*d*) In colour, aroma, and taste the variations were very great, Nos. 8, 7, and 5 being generally good, but for the others the less said the better. No. 4 was very pale.

TABLE 5.—INF. QUASSIÆ CONC.

No. of Series.	Specific Gravity.	Extractive.	Alcohol by Weight.	Colour.	Taste.	Odour.
1. . . .	972·5	0·04	16·6	5	9	7
2. . . .	978·0	0·14	12·9	8	6	6
3. . . .	978·7	0·12	12·4	2	8	3
4. . . .	986·5	0·74	10·9	3	2	8
5. . . .	974·0	0·14	16·3	6	4	5
6. . .	981·5	0·24	11·4	3	5	8
7.	980·5	0·21	12·4	9	7	2
8. . .	978·0	0·37	14·5	7	2	4
Fresh .	—	×8=0·22	—	1	1	1

NOTES ON TABLE 5.

(*a*) Nos. 1 and 3 are very low in extractive and very weak in bitterness. Cannot be said to represent the infusion at all.

(*b*) Colour.—No. 7 was very dark, fully double the depth of a fresh infusion.

(*c*) Odour.—Nos. 4, 6, and 1 were peculiar and suggested mouldiness.

(*d*) Extractive.—No. 4 contains an excess of solids, but this is mainly due to boric acid, which accounts for 0·5 per cent., leaving a normal amount of natural solids. This is doubtless added to admit of low percentage of alcohol being used. I may add all the samples of every series were examined for fomaldehyde and boric acid, but with negative results except in this instance.

In conclusion, it would appear from these results that the concentrated infusions of commerce leave much to be desired. Some manufacturers turn out preparations which are fairly good representatives of the fresh, but others are lamentably bad. Surely it is not too much for the retail pharmacist to demand that these preparations shall be more in accordance with the claims made upon the labels used.

Most of these determinations were made by my assistants, Messrs. J. A. Brown, F.I.C., and D. Henville, to whom my thanks are due.

The PRESIDENT said that wholesalers had in view the characteristic odour of the drug and the use of sufficient alcohol to act as a preservative, and did not give so much regard to the colour as Mr. Cripps wanted. Infusions are very complex, and it is not easy to determine their medicinal activity. He had given a method for determining that of cascarilla, but they knew that the bitterness is not due to cascarillin alone. The proportion of cascarillin in the drug had notably decreased during recent years. Pharmacists were likely to overlook the fact that the amount of active principle in drugs varied.

Mr. **Bird** said the paper threw much light on these preparations. In the case of Inf. Calumbæ Conc. the colour was found to be very dark. This is due to the heating, and it is necessary to avoid heat in making this preparation. Inf. Cascarillæ is difficult to prepare in a concentrated form, because the bitter principle and volatile oil require a large amount of alcohol to dissolve them in such a concentration. Pharmacists unfortunately demand a bright infusion, which seems more important to them than one that more nearly represents the fresh infusion. He was much struck by the absence of alkaloid in the Inf. Cinchonæ Conc., as by the use of an acid menstruum a high percentage is readily obtained. The deposit is a difficulty, but the opalescence in the fresh infusion varies with the fineness of the straining material used. He would like to ask if Mr. Cripps had examined the B.P.C. Inf. Gent. Co. Conc., as he himself had found it very satisfactory. Inf. Quassiæ Conc. was quite easy to make, and there should be no difficulty in obtaining a good preparation. The reason of failure is the use of tap water and heat. The high extractive is due to the salts of the water. He hoped that the paper would call the attention of manufacturers to the subject and lead to better results.

Mr. J. C. **Umney** quoted from the Preface of the Pharmacopœia regarding the "Liquores Concentrati," which showed that the compilers recognized that these preparations could not represent the fresh infusions. Therefore, they should not insert "concentrated infusions," but should either omit them or leave them simply as liquors.

Dr. **Attfield** said that while, of course, it was the duty of the pharmacist to produce drug-preparations that look nice, smell nice, and are active, leaders of the medical profession had reminded him that the public do not like to take decoctions or infusions of any kind, fresh or "concentrated," "nice" or nasty, if they can avoid it. The compilers of the British Pharmacopœia, as seen on page xvii. of its preface, had found great difficulty in dealing with these so-called "concentrated" infusions, but they regarded them as different from the fresh infusions. One must not expect to obtain, whatever it says on a label, a true concentrated infusion. The name is a misleading one, indeed a misnomer. Better term these liquids *liquores*, in the absence of any better name.

Mr. J. R. **Hill** said that the President stated the wholesalers were not particular as to the colour of these preparations, but the greatest difficulty is due to the colour, as the public notices it. In the best pharmacies in Edinburgh it is customary to use fresh infusions, and when a prescription that has been dispensed with these is taken elsewhere and dispensed with the concentrated infusion the patient objects. In one case the medical practitioner had much confidence in the second dispenser, and it required a practical demonstration to convince him that the first dispenser was correct. He wondered whether the use of concentrated infusions would be considered justifiable under the Food and Drugs Acts. Mr. Cripps' results agreed with some he had obtained some years ago, but the later ones show some better results. He was informed by the makers of Inf. Calumb. Conc. for a large dispensary that the second lot of infusion made from the same lot of drug was better, darker, and more bitter than the first. It has been for many years the practice in Edinburgh to make fresh infusions and to sterilize them. White's method has been adopted by several pharmacists recently. In dispensing one ought to use nothing but fresh infusions and concentrated infusions are quite illegitimate.

Mr. **Boorne** said that, although taste and colour are important, the chief point is the therapeutic value. If this also is concentrated eight times, greater convenience justifies such use. Mr. Rutherford Hill said that fresh infusions are used in Edinburgh, but this is not the case in England.

Mr. **Gerrard** said that it was largely a question of ethics. The doctor's prescription must be respected, and if he orders an infusion he does not mean concentrated infusion, and therefore pharmacists should see that he gets what he orders.

Mr. W. F. **Wells** agreed with Mr. Hill that the difficulty lay in the difference in appearance which was noticed by the patients, who will frequently travel a long way to get the fresh infusion. Pharmacists ought not to give concentrated infusions, and ought to follow the Pharmacopœia. He knew a firm where they never made a pill, and always sent out the nearest in stock when a prescription for pills came in. This practice is just as justifiable as the use of concentrated infusions : it is only a question of degree.

Mr. **Gilmour** did not agree that pharmacists in Scotland always used fresh infusions, and he was afraid that there was a great temptation to use concentrated infusions. This practice is totally unjustifiable, and there is nothing to say in its defence. These questions are usually discussed from a manufacturer's point of view, but they could do without their help by using fresh infusions. One may say that the use of Inf. Digitalis Conc. is nearly a criminal action, because there is such a great difference in the effects of this and of the fresh infusion. The rule should be always to use the fresh preparation, and Mr. Cripps' paper is a further lesson to this effect.

Mr. Cripps, in reply, said that the President had said there had been a decrease in the percentage of cascarillin in cascarilla bark in recent years, but this does not account for the variation in these samples, as they were all bought this year. The method used for the determination of bitter principle is crude, but, nevertheless, it gives concordant results, and such great differences as are shown in the infusions are altogether disreputable. He would, as a public analyst, condemn a sample made from the worst sample of Inf. Cascarillæ Conc., but, in view of the general knowledge of medical men that concentrated infusions are generally used, he would not condemn a sample merely on the ground of the use of such a preparation if it fairly represents the fresh infusion. That was merely his own opinion, and might not be followed by another public analyst. It is impossible to obtain a clear Inf. Cascarillæ Conc. without the use of a large proportion of alcohol. He had always understood that Inf. Cinchonæ should be opalescent; he thought it should be strained through tow while hot; if allowed to cool before straining it is obtained much clearer. The question of labelling has arisen. Some firms send these preparations out with a label stating that on dilution they yield the infusion of the Pharmacopœia. This is greatly to be deplored, and is misleading and untrue, and, therefore, wholesale firms should use other labels. Sterilization of fresh infusions will probably be used more and more. Convenience should in no instance be allowed to prevent the preparation used fairly representing what is intended.

DECOCTUM ALOES CO. CONCENTRATUM.

By R. A. Cripps, F.I.C.

Public Analyst for Bournemouth.

About a year ago my attention was drawn to the above preparation by the fact that five samples purporting to be "Dec. Aloes Co. B.P." were submitted to me for analysis under the Food and Drugs Acts, they having been dispensed from a prescription for Dec. Aloes Co. B.P., ℥vi.

The results of these analyses proved all to be gravely deficient in alcohol, and three samples were also seriously deficient in "extractive," rendering it almost certain that they had been dispensed by diluting the concentrated preparation with water; the results of these analyses are shown in Table I., together with a sample specially prepared in accordance with the formula of the B.P.; this is marked "No 1." Sample No. 7 was from my friend, Mr. S. Hardwick, of Bournemouth, who told me it was of the B.P strength and about nine months old.

TABLE NO. I.

No. of Sample.	1.	2.	3.	4.*	5.	6.	7.
Specific gravity	1004·5	1005·0	1012·8	1002·5	1012·0	1014·5	1006·0
Total solids .	6·625	3·98	5·2	1·62	4·53	5·08	6·92
Alkalinity of ash, K_2CO_3 (anhydrous)	0·55	0·49	0·51	0·26	0·44	0·57	0·52
Extractive .	6·075	3·49	4·69	1·36	4·09	4·51	6·4
Alcohol as proof spirit by volume .	30·32	12·04	11·4	7·08	9·96	10·6	32·0

An examination of the official formula will at once indicate that the usual (1 to 3) preparation is an impossible compound, and the 1 to 2 article barely possible, containing as it does 90 per cent. of Tinct. Cardam. Co. by volume. This fact has been recognized by some wholesale firms who do not list the stronger (?) preparation, but I found that it was quoted by others without any warning as to producing an article deficient in spirit, and, indeed, some firms have sent out the concentrated article bearing a label stating definitely that when diluted with three or two, as the case may be, volumes of water, this preparation produces the decoction of the British Pharmacopœia. In these circumstances it is scarcely surprising that many retail chemists have assumed that they are quite safe in using such preparations in dispensing, although, as before indicated, the official formula alone should have been sufficient to arouse the strongest suspicion to the contrary.

---

* It afterwards transpired that Sample No. 4 had been diluted with seven volumes of water instead of three, hence these results should be doubled for comparison.

In order to ascertain the composition of the Dec. Aloes Co. Conc. of commerce, I obtained from friends in retail business nine samples, being the products of as many different wholesale firms; the majority of these were from firms of repute, but No. 2 of Table II was the article sent out by a London firm who "cut" prices to a very low figure. Table No. II refers to samples of the 1 to 3 preparation, and No. 3 to those of 1 to 2 strength, in each case reduced by dilution with the prescribed proportion of water, so as to be comparative.

TABLE NO. II.—(CONCENTRATION 1 to 3.)

No. of Sample.	1.	2.	3.	4.	5.	6.	7.
Specific gravity	1·0146	1·000	1·0162	1·0248	1011·1	999·0	1012·8
Total solids .	5·08	1·9	5·59	8·66	4·91	4·35	5·2
Alkalinity calculated as K_2CO_3 (anhydrous) .	0·47	0·32	0·48	0·49	0·46	0·31	0·5
Extractive .	4·61	1·58	5·11	8·17	4·45	4·04	4·7
Alcohol as proof spirit by volume . .	7·66	12·18	7·96	9·51	7·56	21·5	10·0

TABLE NO. III.—(CONCENTRATION 1 to 2.)

No. of Sample.	8.	9.	10.	11.
Specific gravity . .	1006·4	996·6	1015·5	1000·2
Total solids . . .	5·03	4·49	5·47	5·54
Alkalinity (as K_2CO_3)	0·40	0·32	0·61	0·5
Extractive . . .	4·63	4·17	4·86	5·04
Alcohol as proof spirit by volume . .	18·43	25·4	9·06	30·12

These results show a serious deficiency in alcoholic strength in the case of every sample except No. 11, which was made by myself by the following method :—The extracts of aloes, licorice, and myrrh were softened at a gentle heat with the addition of the least possible quantity of water. Potassium carbonate added, then the tincture gradually, at first well rubbing down in a mortar, and finally made up to volume with distilled water. Samples 6 and 9 are roughly 10 per cent. deficient in "extractive," assuming

4·5 per cent. to be the minimum for a well-prepared article.[1] I have never known a decoction of B.P. strength to give anything like so low a figure as this; it is frequently over 6 per cent.

In conclusion I wish to express my opinion that concentrated decoction of aloes is (except for the making of proprietaries) an altogether unnecessary preparation; the B.P. article is easily made and keeps well, certainly as well as its concentrated representative of 1 to 3 or 1 to 2 strength.

The **President** said, with reference to the determination of alcoholic strength, there appeared to be no difficulty in making it 1 to 2. It answered the requirements which Mr. Cripps had fixed in regard to total solids and alkaloids.

Mr. **Bird** could not agree with Mr. Cripps that Decoctum Aloes Co. Conc. was an unnecessary preparation, because there was a great demand for it, and, moreover, there was no difficulty in making a concentrated preparation equal to the dilute official one if properly mixed with alcohol and water. He had examined a good many samples of concentrated decoction when diluted, and he experienced no difficulty in getting the proper amount of extractive. He noticed that one sample in Mr. Cripps' table yielded 8 per cent., which was more than necessary. The average for the B.P. preparation he had also found to be about 6 per cent. It was strange that for many years it was the custom to send out the concentrated decoction as B.P. when diluted, and no one seemed to find out that the thing was impossible till attention was directed to it some time ago. Most wholesale houses point out that the concentrated decoction diluted 1–3 with water only gives a preparation containing all the medicinal ingredients of the

---

[1] Taking the B.P. formula, and calculating "extractive" from the percentage of each of the solid constituents soluble in a weak alkaline liquid, I should (theoretically) place the minimum extractive at 4·8 per cent., the maximum at 6·65 per cent., as follows:—

—	Proportion in Decoction.	Per cent. Soluble.	Per cent. Solids in Decoction.
Ext. Aloes	1·0 p c.	60 to 80	0·6 — 0·8
Myrrh	0·5 p.c.	30 to 60	0·15 — 0·30
Saffron	0·5 p.c.	30 to 50	0·15 — 0·25
Ext. Licorice	4·0 p.c.	60 to 80	2·4 — 3·2
Comp. Tinct. Cardamom	30·0 p.c.	5 to 7 p.c. extractive.	1·5 — 2·1
			4·80 to 6·65

B.P., but deficient in alcohol, and that if the diluted product is to be strictly B.P., then a certain amount of alcohol and water must be used for dilution according to the formula given on the label.

Mr. Cripps, in reply to Mr. Bird's remark about the labels now requiring alcohol and water to be added, said it was not so in the case of labels he had described, as some of them distinctly stated it produced the B.P. preparation when diluted with water only.

A CONTRIBUTION TO THE PHARMACY OF CAPSICUM.

By A. W. Gerrard.

The main object of the work presented in this communication has been to determine the best all-round solvent of the active principles of official capsicum fruit, with the view of obtaining an extract representing the full activity of the drug. It was further desired that the extract should be of such a nature as to be capable of being utilized in the manufacture of other galenicals of capsicum. Another object is to elicit by discussion among the members of this Conference information as to the extent to which capsicum preparations are in demand; that is, whether their use is on the increase or decline, and the kind of preparations most favoured by the medical profession and the public. Observations of my own, extending over the past three years, go to show that capsicum is growing in favour, especially in the form of local applications, as I have had to prepare in increasing amounts not only ointments, but capsicum wools and plasters of various kinds.

The literature of the subject, in so far as British pharmacy is concerned, is not at all extensive—in fact, it is scanty; nevertheless, the work of one investigator stands out pre-eminent to all others. I allude to the research work of Dr. J. C. Thresh, an old colleague and officer of this Conference, who discovered and clearly defined the crystalline active principle of capsicum. Dr. Thresh's communications are the only ones to which I have been able to refer with any profit or satisfaction; and although the author does not enter into the galenical pharmacy of capsicum, he throws much light on its behaviour towards solvents. Information from this source has guided many of my experiments and enabled me to confirm most of Dr. Thresh's work.

Bearing in mind the fact that capsicum fruit, in addition to resin, contains much fat, which Dr. Thresh states is palmitic acid, it was deemed expedient to percolate the drug with such fluids as are well-known solvents of resins and fats. The following experiments were therefore made :—

Ten grammes of capsicum in No. 60 powder was packed in each of six percolators, composed of glass syringe tubes, and slowly percolated respectively with ether, 90 per cent. alcohol, benzine, petroleum ether, bisulphide of carbon, and chloroform until 100 c.c. of percolate had collected from each. The percolates were evaporated over a steam bath until the solvent was quite removed. The residues obtained were weighed, and are given here as percentages :—

Solvents Used.	Percentage Yield of Extract.
Ether	18·2
Alcohol, 90 per cent.	26·4
Benzine	18·6
Petroleum ether	16·4
Bisulphide of carbon	16·7
Chloroform	17·5

The physical characters of each extract differed somewhat; all of them on standing twenty-four hours deposited a soft granular fat, and separated a fluid dark red resin. The fat yielded from the carbon bisulphide was somewhat crystalline, and in the resinous portion of the extract numerous small crystals were seen floating. The palest coloured extract was obtained by petroleum ether, which solvent does not readily remove the colour from capsicum. To test the activity of the various extracts small portions of each were applied to the skin of the arm: all were found powerfully stimulating. To make certain that the powdered capsicum in each case had been properly exhausted, small portions of each marc were tasted, and except in the case of the alcohol-treated marc, all were found to possess much pungency. The alcoholic marc, though slightly warm to the taste, might certainly be considered as practically exhausted. It is thus evident that a much larger yield of extract is obtained by alcohol than by the other solvents, the alcohol giving 26·4 per cent., against an average of 17·5 per cent. from the others, a difference in favour of the alcohol of about 35 per cent. The question now arose whether the extract retained in the pungent residues was worth recovery. To test the point, the following experiment was made: The dried marcs or residues of the previous extractions, except that with alcohol, were again packed in the percolators and treated with 90 per cent. alcohol until 100 c.c. had been collected; on evaporation of the alcohol there was obtained in each case a brown, resinous, strongly pungent residue, in the following proportions:—

From the ether marc	7·9 per cent.
Benzine	7·5 per cent.
Petroleum ether	9·0 per cent.
Bisulphide of carbon	7·2 per cent.
Chloroform	7·4 per cent.

By adding these figures to the previously obtained figures, under their proper solvents, we get approximately the same amount of extract as when alcohol alone is employed. The unmistakable lesson then of these experiments is to show that alcohol is the most powerful and perfect solvent of the drug capsicum. The conclusion thus arrived at will come, no doubt, as a surprise to many who have long been taught to regard ether as the perfection of solvents for this drug.

Having decided the question of the most suitable solvent for capsicum, attention was next given to the provision of a working formula for the manufacture of a satisfactory extract. Noticing that the semi-solid alcoholic extract of previous experiments had separated on standing into two portions, it was deemed that this want of homogeneity would not recommend it for pharmaceutical purposes. On diluting, however, the extract with its own weight of 90 per cent. alcohol it became quite fluid and perfectly homogeneous, and in this form will no doubt prove itself a valuable and convenient preparation for general use. Based on the foregoing results, the following formula has been devised:—

LIQUID EXTRACT OF CAPSICUM.

Take of capsicum fruit in No. 60 powder 100 parts, exhaust it by percolation with 90 per cent. alcohol, distil off the alcohol until the residual extract weighs 50 parts.

Each grain of this extract is equivalent to 2 grains of powdered capsicum, and should yield on evaporation of the alcohol not less than half its weight of semi-solid extract. The process followed is similar to that for liquid extract of capsicum of the U.S.P., but the product of the new formula is double the American strength in capsicum. This extra strength was determined on for the good reason that it gave an extract far more suitable for the manufacture of other galenicals of capsicum than would have been the case had I diluted with more alcohol, as in the American extract.

Attention may now usefully be given to a consideration of the pharmacy of several well-known official and unofficial preparations of capsicum, especially as the above results indicate that certain preparations of the drug are not formulated on the most correct lines. The so-called oleoresin of capsicum, for example, is one of the worst of them, though often regarded as one of the best. It provides a shocking example of pharmaceutical waste, a waste unworthy of nineteenth-century pharmacy. Made, as you know, by extraction with ether, the ether leaves it as a loosely mingled mass of resin and fat. This mixture is placed on muslin and allowed to drain, with the result that 5 to 6 per cent., calculated on the drug, of the so-called oleoresin drains off, and about 13 per cent. of fat and other matters remain on the strainer, and is usually thrown away. If an examination be made, however, of the fatty residue, it will be found intensely active when applied to the skin, and no wonder this is the case when we know, as pointed out by Dr. Thresh, that fats are powerful solvents of capsicum. Were it possible by some simple means to separate the active principle from the fat, and get it into the resin, then the fat might with good reason be rejected ; but until such a process is discovered it is folly to throw away such valuable material. If oleoresin of capsicum is to have a place in pharmacy, let it be the whole thing, not half. The "Unofficial Formulary" of this Conference contains an ointment of eleoresin of capsicum which is as ill or even worse conceived than the oleoresin. This ointment contains in 5 oz., 1 oz. of oleoresin, equivalent to the prodigious quantity of 20 oz. of powdered capsicum. No careful pharmacist, we may be sure, will take this formula seriously, so we are not surprised that the late W. Martindale said, "It is much too strong for tender skins."

We turn with more satisfaction to the capsicum ointment of the B.P., and though the process is wasteful the product is fairly active. An improvement which would strengthen it and lessen the heat and time of maceration required would be to use No. 60 powder instead of crushed capsicum. It should be known that there is an average loss of 20 per cent. of ingredients in making this ointment, due to the fats taken up by the crushed capsicum. Following is a revised formula for this ointment, in which an amount of extract is employed corresponding with the amount of capsicum used in the B.P. ointment. This ointment is simple to prepare, free from waste, and full of activity.

OINTMENT OF CAPSICUM.

Liquid extract of capsicum	60 grains.
Olive oil	1 oz.
Spermaceti	60 grains.

Melt the oil and spermaceti together, stir in the extract, and allow to cool.

An altogether more rational and superior ointment from a therapeutic point of view is one made with a lanolin base. We all know that lanolin gets drugs into the skin more readily than other fats, and this is the case when mixed with capsicum. The following is a good formula :—

LANOLIN OINTMENT OF CAPSICUM.

Liquid extract of capsicum	60 grain.
Hydrous lanolin	1 oz. 60 grains.

Melt the lanolin with a gentle heat and stir in the extract.

Capsicum wool, in various forms under proprietary names, has long been before the public, but I am unaware that any formula has been published for its preparation, so submit the following :—

CAPSICUM WOOL.

Liquid extract of capsicum	2 oz.
Absorbent cotton in thin sheets	9 oz.
Alcohol, 90 per cent.	7 oz.

Dissolve the extract in the alcohol, and pour the solution on to the cotton, under pressure, in such a manner that the cotton becomes evenly saturated with the whole of the fluid. Dry the cotton, and preserve it in well-closed cartons. This wool contains 10 per cent. of solid extract of capsicum. When freshly made it is of a pale orange colour; age bleaches it without loss of strength. To keep its colour uniform, it is advisable to lightly dye it with eosin. Capsicum wool acts slowly on the skin when dry, but rapidly in the presence of moisture; hence covering the wool with a waterproof protective facilitates its action.

Capsicum plaster is the last preparation with which I interd to deal. Two published formulæ are known to me. That of the U.S.P., and that of University College Hospital Pharmacopœia. The former of these is of very amateurish construction, looking uncommonly like a makeshift plaster. It is prepared by spreading resin plaster on muslin, and painting on each 4 square inches 4 grains of oleoresin of capsicum. The spreading of resin plaster on muslin is no easy matter, as the material is thin and flimsy, hence the plaster works through it; a stouter cloth should have been selected, the oleoresin should have been melted into the resin plaster, and the mixture spread at one operation. The formula of University College Hospital was devised by myself many years ago; it is an active plaster, but can be improved by using the new liquid extract mentioned above in its preparation. Here is a formula:—

Capsicum Plaster.

Liquid extract of capsicum	10 parts
Resin plaster	95 parts

Evaporate the spirit from the extract over a water-bath, then stir it into the melted resin plaster.

When fresh made and spread, this plaster is of a bright orange colour, but with age it bleaches; hence, perhaps, it is advisable to give it a shade of artificial colouring with a resin such as dragons' blood. This plaster, though only containing 5 per cent. of solid extract, is the most active of the preparations here formulated; it adheres closely to the skin, and thus is able to exercise its stimulating property for a considerable time. As a warming plaster I do not hesitate in saying it puts the miserable calefacient plaster of the B.P. outside consideration.

In conclusion, permit me to say that the above formulæ have the merit of simplicity, and are offered for your trial and criticism, with the hope that some of them at least may prove of service to pharmacy, to the medical profession, and to the public.

The **President** said Mr. Gerrard had showed how necessary it was at frequent intervals to investigate the pharmacy of well-known drugs and to study them in the recent light thrown on the chemistry of these drugs. Referring to the use of acetone as a solvent for capsicin, he said he would leave Mr. Umney to deal with that question, as he understood that he had made numerous investigations in that direction.

Mr. J. C. **Umney** said he had made a series of experiments for the B.P.C. Formulary with a view to finding what was the most suitable solvent for preparing capsicin and gingerin. He had come to the conclusion in the case of ginger that acetone was the best where a flavouring preparation was desired, because the solvent was one easily removed by distillation, especially under reduced pressure, and thus no volatile oil was lost. In the case of capsicum alcohol yielded the greatest proportion of extractive, and the extract was the most homogeneous, and probably for internal use was the best. He did not know, however, whether for external use the preparation of the U.S.P.—viz., the oleoresin, separated from fixed fat—was not more powerful.

Mr. R. **Brodie** referred to the fact that the author had not mentioned any experiment with dilute alcohol. He himself had found in practice that 90 per cent. alcohol produced a tincture brighter in colour than that of the B P. His own tincture press was a powerful one, and he found, on pressing, that a good deal of fatty matter came through and subsequently deposited from the tincture. He had at first been reluctant to taste the fat, but on doing so he found that it simply had the taste of grease, and could have no effect on the skin.

Mr. **Alcock** referred to the fact that a distinguished Birmingham physician, who had been aided in his experiments by well-known pharmacists of that city, prescribed ethereal tinctures. His reason for preferring the ethereal tincture was that it was more easily absorbed by the skin, and not that it contained all the active constituents of capsicum. He asked whether the author had tested his products for neutral fat. Dr. Attfield had pointed out, many years ago, that oleic acid would dissolve alkaloids; and if the active principle of capsicin was an alkaloid, that would account for its solubility in free fat-acids. Could it be said that the compound was palmitate of capsicin ?

Mr. **Bird** was pleased that alcohol had proved satisfactory. Although ether was a very valuable solvent, it was advisable to avoid its use. He referred to Mr. Gerrard's paper as a model which constituted a distinct advance in the pharmacy of capsicum.

Mr. **Ransom**, speaking from practical experience, said that, although alcohol was the best solvent, there was no doubt that a stronger preparation could be made with ether if the fat were removed. There was a demand for this ethereal extract.

Mr. **Upsher Smith** raised a question in connexion with capsicum wool. This wool was to be applied to the skin, and its value depended on the promotion of an active flow of perspiration. The wool was more satisfactory if it contained less fat and resin, which tended to form a protective layer on the fibres, and so prevented perspiration from permeating the wool. If a process could be devised for lessening the amount of fat and resin it would be desirable.

The **President**, before calling on Mr. Gerrard to reply, referred to the fact that the tincture of capsicum of the B.P. had an unsightly appearance in the cold weather, and based a question on that fact.

Mr. **Gerrard** said he was glad those who discussed his paper seemed to be in favour of the use of alcohol as a solvent. The question had been raised as to whether the alcohol extract was relatively more active than that of ether. He should say that, dose for dose, it was not, but that it did contain, calculated on the yield, a larger amount of the active principles. When ether was used he found that 7 or 8 per cent. of active extractive was left behind. Replying to Mr. Brodie's question with regard to the fact that a preparation made with 70 per cent. alcohol was freer from fat than that made with 90 per cent., if a weaker alcohol were used, a lower percentage of fat would be found in the resultant tincture, while the preparation would be just as active, although it might contain more extractive matter, which, however, was no disadvantage. He did not know—this in answer to Mr. Alcock—whether the fat was neutral or acid, but it did not make much difference. Capsicin was an active principle of a class which had not yet been defined. Referring to Mr. Smith's question as regards capsicum wool, he said it was preferable to eliminate the fatty matter, but he did not think it made very much difference. A 5 per cent. capsicum plaster was more active than a 10 per cent. capsicum wool, because the former came into more intimate contact with the skin.

NOTE ON THE ANALYSIS OF COMPOUND TINCTURE OF CAMPHOR.

By F. C. J. Bird.

> This compound tincture of camphor contains in each fluid drachm a proportion of tincture of opium equivalent to one-thirtieth grain of morphine hydrochloride, or to $\frac{1}{4}$ grain of opium (containing 10 per cent. of anhydrous morphine), or to nearly 0·5 milligramme (0·00046 Gm.) of anhydrous morphine in each cubic centimetre.

The foregoing statement is found in the British Pharmacopœia as an official note following the formula given for the preparation of compound tincture of camphor, but no analytical method is indicated or suggested by which the strength in morphine of a sample of this tincture can be ascertained. Naturally, the official process for tincture of opium first presents itself as being applicable, but on turning to the directions given for the analytical examination of tincture of opium it is observed that to work with the equivalent of the official quantity of 80 c.c. of tincture of opium it is necessary to operate on no less a volume than about 1,300 c.c. of compound tincture of camphor, or nearly 2 pints 6 fl. oz. Fair results may be obtained, however, by taking 250 c.c. only, evaporating to 6 c.c. and continuing the B.P. process, using one-fifth the official quantities throughout. With these reduced quantities the morphine always comes out a little low. It may be pointed out here that the official statement that compound tincture of camphor contains 0·00046 Gm. of anhydrous morphine in each c.c. is based on the supposition that tincture of opium containing 0·75 per cent. morphine has been used in its preparation. As the B.P. limits for the latter are 0·7 to 0·8 per cent. when tincture of opium of these strengths are employed, the figures for Tinct. Camph. Co. become 0·00043 and 0·00049 respectively—an important point sometimes when a sample taken under the Sale of Food and Drugs Act is in question.

Recent experience with a certain sample led to the writing of this note, as it is evident that an inspector under the Act would rarely purchase even $1\frac{1}{4}$ pints of compound tincture of camphor for the purpose of analysis. This quantity appears to be necessary if approximately accurate quantitative results are to be expected by the B.P. process, as in my own experience

I have found that as the quantity of tincture taken decreases so the figure for the morphine found comes out lower than the truth, until a point is reached when practically no morphine at all can be found in Tr. Camph. Co. of strictly B.P. strength. The custom of many inspectors is to hand in about 2 ounces for analysis, and if the analyst, without previous experience in the assay of this particular preparation, attempts to apply the B.P. process, it is easy to understand that erroneous conclusions may be drawn from the results. In fact, the case already mentioned may be cited as a striking example of this. The facts were as follows: A retail pharmacist in the Midlands supplied an inspector with about 6 fl. oz. of compound tincture of camphor (which he took from a previously unopened Winchester quart) for the purpose of analysis. About 2 fl. oz., constituting one-third of the sample, was handed to the City Analyst, who condemned it as being "deficient in tincture of opium to the extent of 100 per cent.," or in other words as containing no tincture of opium at all, although the preparation was of the proper colour and contained the average amount of alcohol and extractives. On reference to the laboratory books of the manufactures of the tincture there was the fullest evidence that it had been properly prepared, and 250 c.c. from the Winchester quart already mentioned, when carried through the B.P. process, yielded very nearly the correct percentage of morphine, so that there was no doubt that the tincture had been made strictly according to the Pharmacopœia. The City Analyst, before condemning the sample, had taken the precaution to send a portion of it to an eminent London analyst, who confirmed his opinion that no morphine was present, and on this the Town Council decided to prosecute. The second portion of the sample was then handed to another London analyst, who returned it as genuine, and his opinion was confirmed in a further analysis of part of the same sample by one of the highest authorities in the analytical world. A small portion (2·5 c.c.) of the same sample examined by the manufacturer's analyst also afforded abundant evidence of the presence of morphine. On this difference of opinion being represented to the prosecution they agreed to withdraw the summons, provided the third portion of the sample was submitted to an independent analytical authority for the final decision. This was agreed to, and as a result a certificate was received which stated that morphine was present, but only to the extent of about 1-32nd part of the quantity required by the Pharmacopœia, and there the matter rests. Such a state of things is most lamentable, both for the retail pharmacist, who suffers all the annoyance and anxiety of answering the summons, and also for the wholesale house, which is put to the great trouble and very heavy expense of defending the genuineness of a perfectly genuine article against an unwarranted and unjustifiable imputation. There is this much to be said, however, as some excuse for the errors made in this case, that when working with a small quantity of Tr. Camph. Co., such as 10 c.c. (which only contain about 5 milligrammes of morphine), it is quite easy to miss the alkaloid, and in order to prevent similar unpleasant experiences in the future it appeared desirable to bring before the Conference a simple process which would indicate the presence of morphine in a small quantity of compound tincture of camphor, and if possible approximately show the correct percentage to be present. It may be useful to note here that the colour reaction given by meconic acid with ferric chloride cannot be depended upon as an indication of the proportion of opium present in Tr. Camph. Co.; the amount of meconic acid appears to vary enormously in different samples of tincture of opium.

The following process answers well with as little as 2·5 c.c. Tr. Camph. Co. (containing rather more than 1 milligramme morphine), although 10 c.c. is recommended as the most suitable quantity :—

Compound tincture of camphor, 10 c.c. Evaporate to dryness on a water-bath, take up with dilute alcohol and a minute drop of acetic acid, evaporate again to dryness, and dissolve the residue in 2 c.c. distilled water. One drop of this solution tested with Mayer's solution should give a copious precipitate.

Filter the aqueous solution and wash filter with distilled water. Transfer to a small separator and extract with hot amylic alcohol and a few drops of a saturated solution of potassium carbonate. Separate the amylic alcohol and wash the same with ½ c.c. distilled water. Repeat the amylic extraction twice and evaporate the mixed amylic extracts on a water-bath to dryness.

The amylic residue from a genuine tincture is at this stage brownish yellow, but if no opium is present, nearly colourless.

Dissolve the amylic residue in 2 c.c. distilled water and four drops of diluted hydrocholoric acid. Filter the solution through a tiny filter, with a little Pulv. Cret. Gal. to remove colour, until prefectly bright, and wash filter with distilled water. Extract the clear aqueous solution in a separator with 4 c.c. hot amylic alcohol and sufficient powdered ammonium bicarbonate to make alkaline and repeat the extraction twice with successive 2 c.c. quantities of hot amylic alcohol. The mixed amylic extracts should be quite colourless and measure 8 c.c. Evaporate 2 c.c. of the amylic extract to dryness in a very small glass basin, concentrating the residue on to one spot, place on a white surface and moisten the residue with a very dilute solution of neutral ferric chloride. A perfectly distinct dirty blue coloration characteristic of morphine should appear. Another 2 c.c. evaporated should afford an orange yellow colour with nitric acid.

The reactions may be compared with those obtained from 10 c.c. of a known sample of Tr. Camph. Co. carried through the process at the same time, when there should be no difficulty in coming to a conclusion as to the approximate correctness or otherwise of any sample in question. The reactions are also given quite distinctly with the residue from 2·5 c.c. tincture, but when that amount is taken one-fourth only of the quantities of solvent, etc., mentioned in the process must be used throughout.

Note.—It is very important that the amylic alcohol be specially redistilled; 20 or 30 c.c. evaporated in a glass capsule on the water-bath should not leave the slightest residue.

The PRESIDENT said the incident cited by Mr. Bird showed how necessary it was that a process for the detection of morphine in very minute quantities such as existed in compound tincture of camphor should be provided, and pharmacists were greatly indebted—and public analysts, he thought, would also recognize that they were indebted—to Mr. Bird for having made these experiments and provided them with a process for the detection of the alkaloid upon which they might absolutely rely.

Mr. GARSED said so much had been said during the last few years to throw discredit upon colour reactions that he thought it would have been advisable to take the film of alkaloidal residue, dissolve it in a drop of clear lime water or potash, liberate the alkaloid by a drop of ammonium chloride solution, and watch through the microscope for the characteristic crystals of morphine to come out, so as to have corroborative evidence of the presence of morphine.

Mr. H. W. **Gadd** said it had long been a source of anxiety that there was no ready means of determining the morphine in compound tincture of camphor. Hitherto the pharmacist could only put in the right amount of opium and trust that the alkaloid was there. Mr. Bird's process involved the working with such small quantities of material that he thought it would require a pharmacist of his (Mr. Bird's) manipulative dexterity to carry it out successfully. It would be better to insist on having an adequate quantity for analysis. He hoped some steps would be taken to direct the attention of the editor of the *Analyst* to this paper, in order that it might be brought to the notice of public analysts.

Mr. **Finnemore** said Mr. Bird in his colour reaction process used ferric chloride, and asked if he had compared this with the colour reaction of molybdic acid in sulphuric acid, which was a very delicate test.

Mr. J. R. **Hill** complimented Mr. Bird on his very characteristic paper, and said he hoped it would be a much-needed caution to public analysts. It was a source of satisfaction to him that Mr. Bird had described a process which, in a much cruder form, he (Mr. Hill) had been using for twenty years, and he had found it in practice to be an exceedingly reliable method. His opinion was that if they got the ferric chloride reaction and the nitric acid reaction they were pretty safe. As to the molybdic acid reaction, it was very delicate with a small quantity of morphine, but unfortunately there were other substances which gave a similar reaction—still, it was a good one to use to corroborate the ferric chloride and nitric acid reactions.

Dr. **Symes** said hitherto the difficulty had been to find the morphine when it was present. He remembered a case where an unqualified person had sold compound tincture of camphor, and it was examined with a view to prosecution under the Pharmacy Act, but in the 2 oz. purchased no morphine was found, and proceedings could not be taken. It was quite possible the morphine was there, but that it was overlooked, and Mr. Bird's process would probably have shown its presence.

Mr. W. S. **Glyn-Jones** emphasized what Mr. Gadd had said as to bringing the paper to the attention of public analysts. He thought there should be some authority who should direct public analysts not to condemn samples except after carrying out such a process as Mr. Bird had set forth. The difficulty now was that though they might submit Mr. Bird's paper to them, public analysts could still go on at their own sweet will applying such tests as they themselves have made, and have the accuracy of those tests accepted in courts of law at the expense of both retailer and wholesaler. He believed the Pharmaceutical Society was taking some steps in the matter of the administration of the Sale of Food and Drugs Acts, and he hoped good would result from the conference with public analysts and others which it was proposed to hold.

Mr. R. A. **Robinson** said the question of administration of the Sale of Food and Drugs Acts was of importance to the community as well as to pharmacists, and the Pharmaceutical Society was endeavouring to bring about some standard of uniformity. He believed public analysts were desirous of conferring with the Pharmaceutical Society and other authorities concerning this matter, and though there had been a little unavoidable delay in arranging a conference, negotiations were proceeding, and he was very hopeful of the result. Pharmacists did not wish for inferiority of drugs, but they did not want to be harrassed by public analysts—their desire was to supply the best preparation based upon the best process.

Mr. E. **White** emphasized what Mr. Bird had said about amylic alcohol, but it was very essential that amylic alcohol (b.p. 128° to 132°) should be pure, so as to ensure a clear colour reaction. He would like to ask Mr. Bird whether he had tried saturating his liquid with some neutral salt to render the extraction of the alkaloids more complete, as it was very essential to get everything out.

Mr. **Alcock** said the difficulty in evaporating amylic alcohol was somewhat great, owing to its high boiling point, and it was possible that, in spite of Mr. Bird's pharmaceutical skill he failed to get the whole of the alkaloid : it was also possible the heat destroyed some of it. The probability was that the analyst found the same difficulty in regard to morphine in compound tincture of camphor. What seemed to be wanted was an immiscible solvent. Amylic alcohol was very good, but he would suggest a more volatile solvent, perhaps a little acetic ether would add to the efficacy of amylic alcohol. He endorsed what had been said by Mr. Glyn-Jones and Mr. Robinson in regard to the proposed conference with public analysts—at present pharmacists suffered great hardship in some cases. A good many years ago a case was brought before the law courts in London in connexion with tincture of quinine, and a public analyst, whose authority was somewhat "highish," gave evidence that he failed to find the proper amount of alkaloid. But a professor of some eminence came forward, and showed that the process employed by the analyst was not the latest or the best process, and the analyst confessed that he had never heard of that process. If the British Pharmacopœia did not give a good process for the extraction of the whole of the alkaloid, and an opposing analyst came forward and showed there was a better process which had extracted more of the alkaloids than the official process, he thought the defendant ought to win the case and to get his full expenses.

Mr. BIRD, in reply, said that a reliable process should be given for the determination of the alkaloidal strength after the pharmacist has made his preparation according to the B.P. He thought that if they got the ferric chloride and nitric acid reactions they could be pretty certain that morphine was present. He might mention the iodic acid test as a reliable one. With regard to the molybdic acid reaction, he did not think it was so characteristic as the ferric chloride, because the reaction with molybdic acid was so very similar to that given with other substances. In regard to Mr. Gadd's remark about the minute instructions, they were necessary in dealing with such microscopic quantities. He might mention that it was shown by the late Mr. A. H. Allen that one of the alkaloids of ipecacuanha gave a very similar reaction to morphine, but there was no reason to suspect that alkaloids of ipecacuanha would be present in compound tincture of camphor. He hoped the proposed conference between the Pharmaceutical Society and public analysts would be productive of good results. He thought such a conference was very desirable, as drug analysis was a special branch, and even a good analyst was liable to get very erroneous results. Such a conference was necessary for the protection of pharmacists and indirectly for the benefit of public analysts. He should adopt the suggestion thrown out by Mr. White about the amylic alcohol. He had no reason to believe that he did not get all the alkaloid out; from the reaction he should think he got most of it. Mr. Alcock had suggested that the morphine was injured by heat in evaporating amylic alcohol. He did not think that was so, as amylic alcohol evaporates very easily, and there was no necessity to heat it to its boiling point. He thought hot amylic alcohol was generally considered the best solvent for morphine.

THE CHEMISTRY AND PHARMACY OF THE LEAVES OF VIOLA ODORATA.

By H. Wippell Gadd, F.C.S.

Violet leaves as a remedy for various morbid conditions have been recommended since the days of James I, and of late years attention has been devoted to them as a remedy for cancerous growths. The evidence of their value for such purposes has, however, been so inconclusive that one took but little interest in the matter, until in March last particulars of a case of "An apparent cure of a presumably malignant growth by the use of violet leaves" appeared in the *Lancet*. The medical man who published the case was so much impressed by it that he desired to make clinical experiments with the leaves. It was ascertained that the leaves used were those of a cultivated species of violets, known to gardeners as the "Princess of Wales." The experiments hereafter described were all made with this species.

Botanists differ as to its exact systematic name, the authorities at Kew stating that it is a selected form of *Viola odorata*; but Mr. E. M. Holmes doubts this conclusion, and thinks it is a hybrid. I submit fresh and dried specimens of the plant, unfortunately collected after the flowering was over, in order that those learned in such matters may tear them, and if necessary, each other, to pieces at their leisure.

For clinical purposes a handful of leaves (about forty, weighing about three and a quarter ounces) is infused in a pint of boiling water, the resultant product being taken internally and applied externally as a fomentation. Experiments and observations have been made with this infusion during the last few months, the results of which will be published in due course.

In the *Lancet* of April 22 last a series of experiments was described, founded on the work of Mandelin, published in 1883. He found that the *Viola tricolor*, var. *arvensis*, contained a glucoside having the composition and properties of quercitrin, which he named "Violaquercitrin." He obtained this glucoside by exhausting the fresh plant with warm alcohol, removing the alcohol by distillation, and treating the residue with warm distilled water. He found on boiling with dilute mineral acid the glucoside decomposed, forming quercetin and a fermentable sugar. He also detected the presence of salicylic acid in minute quantities, both in the leaves of *V. tricolor*, var. *arvensis*, and those of the *V. odorata*. In the latter case, however, the acid was only isolated after the leaves had been boiled with dilute hydrochloric acid.

As it seemed probable that the glucoside, or some product of its hydrolysis, might be the active ingredient of the leaves, a solution was prepared in the following way : The fresh leaves were taken and boiled under a reflux condenser with rectified spirit for two hours. The greater portion of the spirit was then removed by distillation, and the residue evaporated until a sticky, treacle-like mass was obtained. This was treated with water, and the solution diluted sufficiently, so that one fluid part of the finished product should represent one part by weight of the fresh leaves. This solution reduces Fehling's solution, but more freely after being boiled with dilute mineral acid.

The amount of glucoside present was estimated in this way : the precipitated cuprous oxide being collected, washed with water, alcohol, and ether, ignited and weighed as cupric oxide. The result showed the presence of 1·036 per cent. of glucose equal to 3·7 per cent. glucoside, reckoned as quercitrin. The solution was shaken in a separator with ether, the ether was evaporated and the residue treated with hot water, and the aqueous solution tested for salicylic acid with a negative result.

A more exhaustive and systematic examination of the leaves was next started. Their strong, peculiar, and persistent odour suggested the presence of a volatile oil. On heating the fresh leaves in a still, however, no distillate was obtained under 100° C. A liquid having a pleasant odour distilled over at the temperature of a brine bath. No oil separated from this. Water was then added to the contents of the still, and the mixture heated over a glycerin bath. A distillate having an unpleasant odour resulted, but no oil separated from this. It was, therefore, concluded, that the leaves, dried at a low temperature, would not suffer any loss save that of moisture.

A quantity of leaves (about 1,000) were exposed in a hot room for four or five days, the temperature never exceeding 50° C. At the end of that time they were sufficiently dried to be powdered, the dried powdered product weighing twenty per cent. (20 per cent.) of the weight of the fresh leaves. The dry powder, a sample of which is shown, is a convenient form in which to keep the leaves. It might be administered in cachets, or a fresh infusion made from it, or the glucosidal solution described above. Twenty-five Gm. of the powder was taken and exhausted in a Soxhlet tube with a purified petroleum spirit, boiling under 80° C. The spirit was removed by means of a current of air. The residue, which had the consistence of a soft extract, was equal in weight to 2½ per cent. of the weight of the dried leaves taken. It is of an oily nature, free from smell, lighter than water, insoluble in water, soluble in alkalies. Shaken with dilute acid and filtered, the filtrate gave no definite reaction with alkaloidal reagents. On standing, some minute tabular crystals were seen on the surface of the oily mass.

The leaves which had been thus exhausted with petroleum spirit were then treated in a Soxhlet tube with boiling alcohol (absolute) until all the colouring matter was extracted. The alcoholic solution gave no reaction with Fehling's solution, until it had been boiled with dilute mineral acid. The alcoholic solution was evaporated over a water-bath, and the residue had a slightly granular appearance. It rapidly took up moisture, even when kept in a desiccator over chloride of calcium, and attempts to obtain crystals by evaporating *in vacuo* over sulphuric acid failed. The residue was treated with water and filtered. The insoluble portion was shaken with dilute sulphuric acid and filtered. No indication of the presence of an akaloid could be obtained in the filtrate.

The aqueous solution was evaporated over a water-bath, and left an intensely sweet treacle-like residue. No crystals could be obtained from this residue *in vacuo* over sulphuric acid. The exhausted marc in the Soxhlet tube consisted chiefly of fibrous matter and starch.

From the above experiments it would seem that any activity violet leaves possess is due either to the glucoside, the products of its decomposition, or a natural ferment associated with it In the present state of our ignorance it is better to use for clinical experiments the drug, the whole drug, and nothing but the drug. "Which would you rather have ?" asked a school inspector, "half an orange or eight-sixteenths of one ?" "Half," was the prompt reply. "Why ?" said the inspector, scenting an imperfect knowledge of fractions. "Because in getting the sixteenths you lose so much juice !"

In dissecting and concentrating, even in purifying, we may destroy the subtle entity with which nature works her wonders.

I have to thank Dr. William Gordon, physician to the Devon and Exeter Hospital, for suggestions and interest from a medical point of view; Mr. F. Southerden, B.Sc., for help on the chemical side; and my pupil, Mr. W. J. H. Clarke, who has done much of the practical work.

The **President** said that most of those present had made themselves familiar with recently published chemical works on this subject. He hoped Mr. Gadd would continue this investigation, since a large quantity of material is required in such cases, and he had the necessary appliances for such.

Mr. **Atkins** related a case, under his own observation, of a lady from South Africa who suffered from cancer and had been given up as hopeless by a celebrated surgeon, but is still living and is intending to return to South Africa. The only treatment she had undergone was the consumption of infusion of violet leaves. He would not say that she was cured or would survive, but the case was of great interest, and he hoped Mr. Gadd would proceed with this investigation.

Dr. **Attfield** said this was a case in which bio-chemical methods were required in addition to chemical and pharmaceutical investigations.

Mr. **Druce** said that the plant used for these experiments was a cultivated form belonging to the *odorata* group. Whatever the results, they would not show whether the wild violet was a cure for cancer. This cultivated garden plant was not in existence in Jacobean times, so that it is not the old drug, but a different one that is being investigated. He thought the experiments should be made on wild violets. He had no doubt that these had a distinct therapeutic action. In one case an infusion had produced sickness, but the patient found an ointment most useful.

Dr. **McWalter** said this paper would do a great deal of good. Even if the hope given to patients is empty and delusive, it does no harm and makes them happy.

Dr. **Martindale** wished to know whether Mr. Gadd had read the report of the Royal Commission on the use of violet leaves. The *Lancet* had stated that an alkaloid allied to emetine had been found in violet leaves, which might account for the emesis produced.

Mr. J. W. **White** agreed with Mr. Druce that it was highly desirable that wild violets should be used.

Mr. **Boorne** related a case, given up by doctors, which had been cured, and it was stated that scented species of violets should be used.

Mr. **Gadd**, in reply, said that he had not been able to isolate quercitrin, but obtained a solution which gave a red colour with ferric chloride. The cure of cancer was no part of his paper. Dr. Gordon was investigating this subject. He accepted Mr. Druce's correction about the form of violets used. He used the Princess of Wales variety, because that was first used by a gardener whose case was the first to be noticed recently, and he had found that this variety was stronger in taste than the wild. He had not found an alkaloid, but would not like to say it was not there.

LABORATORY NOTES ON (*a*) NUX VOMICA SEEDS; (*b*) THE ASSAY OF CINCHONA BARK; (*c*) THE MANUFACTURE OF FERROUS CARBONATE.

By Sydney C. Gadd.

(*a*) In a discussion at Sheffield last year, which followed a paper on "The Distribution of Fat and Strychnine in Nux Vomica," by H. Wippell Gadd and myself (*Y.-B. P.*, 1904, 515), Mr. Alcock suggested that a determination of the reaction of the fat would be instructive. A few samples have been examined in accordance with this suggestion with the following results :—

Decorticated Seeds.

Sample A contained 3·52 per cent. fat. 1 Gm. of this fat required for neutralization 3·4 c.c. N/10 NaOH solution.

Sample B contained fat 3·9 per cent. ; 1 Gm. of which required for neutralization 3 c.c. N/10 NaOH solution.

Hairs and Seeds.

A sample of the hairs from the seeds yielded 10/15 per cent. fat, which was neutral. A sample of hairs and skins yielded 3·33 per cent. fat ; 1 Gm. of which required for neutralization 0·18 c.c. N/10 NaOH solution. It would appear therefore that the fat found in the decorticated seeds is acid in character, whilst that in the hairs is neutral.

LIQUID EXTRACTS

were also prepared and examined.

Liquid extracts made from decorticated seeds. Sample A.—Fat 0·62 per cent.; 1 Gm. of which required for neutralization 3·2 c.c. N/10 NaOH solution. Sample B. Fat 0·78 per cent.; 1 Gm. of which required for neutralization 3 c.c. N/10 NaOH solution.

Liquid extract made from hairs and skins. Fat 1·84 per cent.; 1 Gm. of which required for neutralization 0·16 c.c. N/10 NaOH solution.

Liquid extract made from whole seeds.—Fat 0·83 per cent.; 1 Gm. of which required for neutralization 3·4 c.c. N/10 NaOH solution.

COMMERCIAL SAMPLES OF TINCTURE OF NUX VOMICA.

Sample A.—Fat 0·87 per cent.; 1 Gm. of which required for neutralization 3·4 c.c. N/10 NaOH solution.

Sample B.—Fat 0·88 per cent.; 1 Gm. of which required for neutralization 3·4 c.c. N/10 NaOH solution.

Sample C.—Fat 1·03 per cent.; 1 Gm. of which required for neutralization 3·3 c.c. N/10 NaOH solution.

(*b*) The official process for the

ASSAY OF CINCHONA BARK

requires slight modification and great attention to details to ensure satisfactory results.

The directions might be amplified as follows :—

Take of

Bark	20 Gm.
Slaked lime	6 Gm.

Mix and triturate with 20 c.c. of distilled water. Allow to stand for one hour. Transfer to a 350 c.c. flask, add 130 c.c. benzolated amylic alcohol and attach to a reflux condenser. Boil over a water-bath for half an hour. Decant on a filter paper having a diameter of 13 Cm. Repeat this with two successive 40 c.c. of benzolated amylic alcohol. Transfer the contents of the flask to the filter paper. Wash with 40 c.c. hot benzolated amylic alcohol. Take 6 c.c. dilute hydrochloric acid, and dilute to 42 c.c. with distilled water. Divide this solution into four equal portions and shake the benzolated amylic alcohol solution with each in turn. Wash the benzolated amylic alcohol solution with 10 c.c. distilled water, and add the washings to the mixed acid solutions. Nearly neutralize the solution with solution of ammonia and concentrate to about 20 c.c. If the solution begins to deposit resinous substances, slightly acidulate. Now make the concentrated solution exactly neutral with solution of ammonia. Dissolve 1·5 Gm. of sodium potassium tartrate in 3 c.c. of water, and add this solution to the above with stirring. Remove from the water-bath and set aside for one hour. Filter. Wash and dry the precipitate. Weigh. Eight-tenths of the weight will represent the amount of quinine and cinchonidine in 20 Gm. of the bark. To the filtrate add solution of ammonia, collect, wash, dry and weigh the precipitate. The weight will represent the amount of the other alkaloids in 20 Gm. of the bark.

FERROUS CARBONATE FOR CAPSULES.

(*c*) There is a demand for preparations which shall have the effect of Blaud's pills, without their bulk. After some experiments, the following method has been found to give the most satisfactory results. It is based on the process given in the United States Pharmacopœia for the preparation of saccharated ferrous carbonate.

Take of

Ferrous sulphate	30 lb.
Bicarbonate of sodium	21 lb.
Glucose and water	*q.s.*

Dissolve the ferrous sulphate in 12 gallons of hot water. Dissolve the bicarbonate of sodium in 30 gallons of warm water (about 50° C.). Filter if necessary. When cool, add (1) to (2) in a 60-gallon vessel, with stirring. Fill up the vessel with boiling water. Stir, and set aside. Cover loosely. When cool, syphon off, and reject the clear supernatant liquor. Repeat this twice. Collect the precipitate on calico, and squeeze out the water. Mix the precipitate in a large mortar with 5 per cent. of its weight of glucose. Set aside for seven days. Decant the supernatant water.

The finished product contains about 60 per cent. of ferrous carbonate.

The **PRESIDENT** said these notes were of a very practica character, and the information would prove most useful.

Mr. F. H. Alcock pointed to a sentence in the note on the assay of cinchona bark—" The weight will represent the amount of the other alkaloids in 20 Gm. of the bark." He respectfully begged to say that it will do nothing of the kind. If he took the filtrate, after the addition of ammonia, and treated it with chloroform, he would get another 1 per cent. Mr. R. A. Cripps, although he was not disposed to put it so high as 1 per cent., was inclined to say that at least 10 per cent. of the whole alkaloid was present. He criticized the decanting method of the B.P., and suggested that in the next edition it would be well if quinine was considered separately, and not with cinchonidine.

Mr. Gadd, in replying, said he was not responsible for the defects of the B.P., which did not state quantities to be used. With regard to Mr. Cripps' suggestion, he had no doubt that the extraction could be made in a better way, but one should think twice before deciding to substitute new methods for tried ones.

CASTOR OIL.—PART I.

By Horace Finnemore, A.I.C.

(*Pharmacist to Guy's Hospital*),

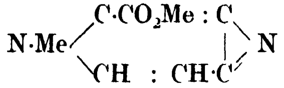
and

Harrold Deane, B.Sc. (Lond.), A.I.C.

A statement in the recently published Research List of this Conference that an investigation is required for the isolation of a purgative principle from castor oil has induced us to look into the literature of this subject, and it seemed that it would be of interest to give an account of the work already published by other investigators.

Ricinine.

Tuson, in 1864 (*Journ. Chem. Soc.*, **17**, 195), separated a crystalline principle from the seeds, to which he gave the name ricinine. He proved it contained nitrogen, and expressed the opinion that it was present in the oil. This substance has been shown to be present in the leaves (Wayne, *Amer. Journ. Pharm.*, 1874, **46**, 97) and in the seedlings (Schultze, *Berichte*, 1897, **30**, 2,197), who gave it the name ricidine, apparently unaware of the existence of ricinine, but from its melting point, other physical characters, and percentage composition it is undoubtedly identical (compare also Evans, *Journ. Amer. Chem. Soc.*, 1900, **22, 39**). This substance has also been investigated by Soave (*Ann. Chim. Farm.*, **21,** 49; *Abs. Chem. Soc.*, 1896, i., 386), and by Werner (*Pharm. Zeit. f. Russ.*, 1870, **9,** 33), who stated that it was a magnesium salt of an organic acid, but who was apparently investigating a different substance. The most recent and most extensive work is by Maquenne and Philippe. (*Comptes Rendus*, 1904, **138,** 506, and 1904, **139,** 840), who obtained 0·2 per cent. from the press-cake. They find the m.p. 201·5° C. (corr.), and show it to be a pyridine derivative, with the empirical formula $C_8H_8N_2O_2$ and the probable structure :—



Dey (*Indigenous Drugs of India*, p. 273) states that ricinine, has no purgative property; Soave (*l.c.*) says it is poisonous, but, as the leaves are used in America and India as a galactogogue, a further pharmacological investigation seems desirable.

Ricin.

Vogl (*Pharmakognosie*, 1892, p. 204) states that Bübnow and Dixson in 1887 discovered a purgative principle named ricinone, and that Stillmark in 1889 discovered a poisonous body which he called ricin. This statement appears in most of the English books on pharmacognosy since published. Bübnow worked under Schmiedeberg, and separated a poisonous substance; but he died before completing his work, and only left very fragmentary notes. These were handed over to Dixson (*Australasian Med. Gaz.*, 1887, **6,** 137), who worked on the same lines, and, by extracting the oil-free cake with dilute acid and precipitating with alkali, and also by extraction with water and precipitation with alcohol, obtained a precipitate which was poisonous and contained much albumen. Its activity was instantly destroyed at a temperature of 100° C. He considered the activity due to a glucoside, but does not give his evidence. He shows from the difference in its pharmacological action, and the fact that the oil is not affected by heating even to 300° C., that this is not the active principle of the oil. From its method of preparation, pharmacological action, and general properties, there seems no doubt that this is the same substance that Stillmark (*Arbeiten des Pharmak. Inst. zu Dorpat.*, III, 1889, p. 59) prepared and called ricin. He extracted the cake with sodium chloride solution and precipitated by saturation with magnesium sulphate and further purified it by dialysis. This is an exceedingly poisonous substance, as little as 0·04 Mgm. per kilo. of body weight being fatal to dogs (Cushny, *Archiv. für Exper. Path. und Pharm.*, 1898, **41,** 439); of a further purified preparation, 0·002 Mgm. per kilo. was fatal to rabbits (Osborne and Mendel, *Amer. Journ. Physiol.*; *Abs. Chem. Soc.*, 1904, II, 198). It is a toxin similar in nature to the bacterial toxins, and Ehrlich (*Deut. Med. Woch.*, 1891. *Fortschritte der Med*, 1897) has shown that an antitoxin (antiricin) is produced. It is interesting to note that the results of this investigation led Ehrlich to the discoveries resulting in the preparation of antidiphtheritic and other sera (Müller, *Archiv. für Exp. Path. und Pharm.*, 1899, **42,** 302).

In addition various enzymes (proteolytic and lipolytic) have been found in the germinating seed, cf. J. R. Green (*Proc. Roy. Soc.*, 1890, **48,** 370) and Nicloux (*Comptes Rendus*, 1904, **138,** 1,352).

RICINOLEIC ACID.

The only fatty acid obtained from the oil that has any pharmacological importance is ricinoleic acid. Claus (*Berichte*, 1876, **9,** 1,916) prepared this by fractionally precipitating with calcium chloride the crude soap obtained from castor oil, rejecting the first third and last sixth of the precipitate; recrystallizing the remainder several times from alcohol and liberating the acid with hydrochloric acid. Thus prepared, the acid has a melting point of 4 5° C. (Juillard, *Bull. Soc. Chim.*, 1895, **13,** 240). Krafft (*Berichte*, 1888, **21,** 2,730) prepared it by saponifying with potash, decomposing with hot hydrochloric acid, washing, cooling until the acid solidifies, and pressing out the liquid acids at a gradually increasing temperature. It was a hard white crystalline solid, melting at 16-17° C., but thus prepared it is probably not pure (Juillard, *loc. cit.*). It is an unsaturated hydroxyacid, probably having the constitution:—

$$CH_3{\cdot}(CH_2)_5{\cdot}CH(OH){\cdot}CH : CH{\cdot}(CH_2)_8COOH.$$

Goldsobel (*Berichte*, 1894, **27,** 3,121) supports the formula:—

$$CH_3{\cdot}(CH_2)_5{\cdot}CH(OH){\cdot}CH_2{\cdot}CH : CH{\cdot}(CH_2)_7{\cdot}COOH.$$

It is converted into a solid isomer ricinelaidic acid by treatment with nitrous acid.

Hazura and Grussner (*Monatshef.*, 1888, **9**, 475), whose work was confirmed by Dieff (*Journ. für Prakt. Chem.*, 1899, **39**) obtained, by oxidation of the liquid fatty acids with alkaline permanganate, two isomeric trihydroxystearic acids respectively melting at 140–142° C. and 110–111° C., and therefore concluded that the oil contained two isomeric acids, ricinoleic and ricinisoleic acids. They were only able to obtain one acid (m.p. 114–115° C.) by the oxidation of ricinelaidic acid (*Monatshef.*, 1889, **10,** 196). But Mangold (*Monatshef.*, 1892, **13,** 326) pointed out that their supposition is unnecessary and unfounded, since two stereoisomeric oxidation products would naturally be obtained by oxidizing an acid containing a double bond; moreover, he found that on the oxidation of ricinelaidic acid two well characterized acids are formed, melting at 117–120° C. and 113–116° C.—a fact which supported his argument.

The next work which bears on this subject was by Scheurer-Kestner (*Comptes Rendus*, 1891, **113,** 201), who found that by the action of water at 150° C. castor oil was decomposed, and a mixture of ricinoleic and diricinoleic acids was formed; by heating at a higher temperature other polymers were obtained. When ricinoleic acid is heated alone it gradually polymerizes. Meyer (*Arch. der Pharm.*, 1897, **235,** 184) showed that this polymerization occurs on keeping the acid for some years.

Hans Meyer (*Archiv. für Exp. Path. und Pharm.*, 1891, **28,** 145) prepared ricinoleic acid by Claus' method, being very careful in recrystallizing the calcium salt many times, also using barium and other salts. These salts gave figures on analysis closely corresponding to the calculated ones. He found by experiments on cats and on men that the acid separated from these salts was as active if not more active than the original castor oil. He also prepared a glyceride by heating the acid with glycerol to 300° C. in a stream of carbon dioxide, and found this to be active. The solid ricinelaidic acid and ricinelaidin were inactive.

Taking into account the solvent power of soap and of fatty acids, Meyer considered the question of a possible active principle which might not be eliminated by his purification. He argued that since ricinelaidic acid was inactive and ricinoleic active this hypothetical substance might have been destroyed by the nitrous acid. But he found on finely dividing ricinelaidic acid in an emulsion that it became active, and therefore the former inactivity was due to its solid condition, which prevents its rapid absorption, and not to the destruction of a purgative principle. After dissolving jalapin or podophyllin in the melted ricinelaidic acid and subsequent cooling, the purgative action was only delayed, but not destroyed. Hence it is evident that any contained purgative principle in the ricinelaidic acid would have exerted its action.

It has been shown by Krich (*Exper. quœdam de Oleis Ricini*, Dorpat, 1857) that rapid absorption is necessary for the purgative action of castor oil, because the irritation which it causes is only temporary, and ends on its absorption, and therefore it cannot, like other laxatives, produce a cumulative effect by gradual absorption. This explains why solid ricinelaidic acid does not purge, as its high melting point prevents rapid digestion.

Dott and Stockman (*Pharm. Journ.*, 1892 [3], **22,** 745) prepared the fatty acids by acting on castor oil with superheated steam, and found them practically inactive on cats and dogs, and therefore concluded that their and Meyer's acids were different. This difference might be explained by the formation of polyricinoleic acids as described by Scheurer-Kestner (*v.s.*) but Meyer states in a later paper that the activity is not destroyed by such treatment.

Meyer, in a further paper (*Archiv. für Exp. Path. und Pharm.*, 1897, **38,** 336), described the preparation of methyl and ethyl esters from ricinoleic acid by the action of dry hydrochloric acid on the alcoholic solution. These were inactive, as was the acid regenerated from them. By treating barium or sodium ricinoleate with the alkyl iodides in sealed tubes at 160° C. and purifying the products by distillation under diminished pressure he obtained esters which were physiologically active, and the acid prepared from these was also active. Hydrochloric acid, therefore, must convert ricinoleic acid under such conditions into another acid, which he called pseudoricinoleic acid.

Ricinolamide prepared by the action of alcoholic ammonia on castor oil occurs as a white crystalline precipitate, which had previously been found to be inactive. This author found that the acid regenerated from it by the action of alkalis was active, whilst that obtained by means of acid was inactive. He thus claims to have shown that only those ricinoleic acid compounds are active which are either themselves soluble in the intestines (alkali soaps) or through decomposition are rendered soluble (glyceryl and alcoholic esters), whilst such compounds as ricinolamide and magnesium ricinoleate which pass through the intestines completely or almost completely unaltered possess no purgative action.

OTHER FATTY ACIDS

Stearic acid (Krafft, *Berichte*, 1888, **21,** 2,730) and dihydroxystearic acid (Juilard, *Bull. Soc. Chim.*, 1895, **13,** 238) have also been found in the oil, but both are inactive (Meyer, *l.c.*).

Lewkowitsch (*Oils, Fats and Waxes*, p. 644) states that, judging from its iodine value in conjunction with its acetyl value, castor oil must contain a less saturated acid than ricinoleic acid, but this is based on a miscalculation due to overlooking the fact that the acetyl value is calculated on the acetylated product and not on the original oil. On p. 270 he calculates the percentage of triricinolein in the oil from an acetyl value of 150·3 and finds it 94·4, while on p. 644, using an acetyl value of 150, he finds it to be 83·1. Neither of these figures is a correct deduction from his premises. The molecular weight of triacetylricinolein is 1,058, and its calculated acetyl value 159·1. Taking the acetyl value of acetylated castor oil as 150·3, the percentage of triacetylricinolein in it is 94·4 and the amount of non-acetylated glycerides is 100 – 94·4 = 5·6. As the molecular weight of triricinolein is 932, 94·4 of triacetylricinolein is produced from 83·1 triricinolein, and therefore the percentage of triricinolein in the oil is $\frac{83{\cdot}1 \times 100}{83{\cdot}1 + 5{\cdot}6} = 93{\cdot}68$. The oil contains about 1 per cent. of dihydroxystearic acid with an acetyl value of 271·9 (not 281·9, cf., p. 644, Lewkowitsch), and therefore the percentage of triricinolein is about 92; the calculated iodine value of triricinolein is 81·76, and therefore the oil containing 92 per cent. would have an iodine value of 75·2, but the actual value found is 84–86, so another unsaturated acid must be present, though in smaller amount than deduced by Lewkowitsch.

In this account we have omitted to mention numerous papers dealing purely with the chemical behaviour of these substances, and also several papers on the physiological action of ricin.

CONCLUSION.

It seems to us that the above results conclusively show that the purgative action of the oil is due to the fatty acids, but it is not quite clear whether ricinoleic acid has been obtained absolutely pure, or that it is the only purging fatty acid in the oil, and in any case it appears that there must be other undiscovered acids. We hope to have the opportunity of elucidating these points.

The PRESIDENT complimented the authors on their work, and referred to the fact that this was the first paper they had contributed to the Conference.

AMATEUR LABORATORY CONSTRUCTION.

BY EVELYN WM. POLLARD, B.SC.,
Pharmaceutical Chemist.

In the following notes I propose to give my personal experience of the methods and cost of making a laboratory. I presuppose that the pharmacist is a "handy man," and familiar with the use of such tools as the screw-driver, plane, brace and bit, soldering-iron, etc. First, with regard to the position of the proposed laboratory; it should be as far away from the shop as convenient, so that no perfume can filter from it to customers, and, for the same reason, should not form part of the dwelling house, though many students do good work in their bedrooms. Space is like time—the energetic man "makes it." I requisitioned a part of a large bottle store, cutting off a space about 11ft. by 8ft. by a matchboard partition; the part cut off should be provided with lock and key, so that no one can interfere with any delicate operation. Shelves are fitted as convenient, taking into account the position of the light. I have two long and wide shelves on the partition for storing general apparatus and stock bottles. If the walls are of brick the wall is plugged with wood, and uprights fixed, to which brackets carrying the shelves are fixed. On another wall the shelves for the reagent bottles are fixed; these are conveniently five in number, 4ft. long, 3in. wide; each takes eighteen ordinary 6-oz. bottles; the two upper shelves I reserve for "oddments" in bottles. They are all within very convenient reach, immediately above the working bench. For the bench I use an elm board, 8ft. by 2ft., supported on trestles; this has the advantage of being movable; a chemical bench while being steady need not be as firm as a carpenter's bench. The shelves and bench are "ironed" with paraffin wax.

A table for the balance and a stool complete the furniture. Gas and water must be laid on; whether the pharmacist will do this himself depends on his skill as a plumber. Gas fitting is easy for the "handy man," but laying on water requires more skill, as well as physical force. One ordinary straight gas bracket and two nozzles near the bench for gas, and two water taps will usually suffice. The sink is rather a bother, the fitting of a proper one entailing some amount of mason's work, and, therefore, expense. One that answers every purpose is made by lining a strong, wood box with lead and having an exit tube of ½in. "compo" pipe, the exit being protected by gauze. The tube can be carried to any convenient gutter. Care must, of course, be taken not to throw down any greasy or sticky substance that would block a narrow pipe. A great convenience in connexion with the water supply is a filter pump; a metallic one can be made from an old blowpipe by boring a hole at the broad end, and soldering a tube with narrow orifice in as shown in Fig. 1.

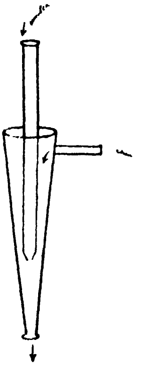
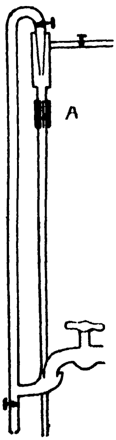


Fig 1

Fig 2



I have an adapter to my only water-tap, which is continued to a tube having a branch to the sink and another to the filter pump; the latter is about 4ft. long. The exit tube of the pump is a glass one, joined by an I.R. connexion at A, Fig. 2. This connexion is very convenient for a water supply in conducting a high distillation or reflux, as in the use of a Soxhlet with vertical condenser. Taps are fitted as shown in the diagram. In making these joints a very useful little instrument for soldering is made by fitting a tiny phial of spirit with wick just below the nozzle of an ordinary blow pipe. This can be carried about and soldering done in mid-air without the iron.

A centifuge is also a great addition to any laboratory; I use one described by Spurge (*Year-Book*, 1902) which consists simply of a bicycle wheel and a bicycle hub. Mine is fixed direct to the floor, and the particular kind of hub used is a Singer back-wheel, in which the cogged wheel is perforated with holes through which screws can be passed. A hole is braced in the floor to take the lower end of the spindle. A number of different size containers can be nutted at A. Fig. 3 B is a light strip of brass turned up at the ends and lined with cork; ordinary test-tubes can be fitted to this by strong rubber bands, and with so light a load a speed of 2,000 revolutions can be attained; this is a perfect luxury for precipitates, such as alumina, in ordinary analysis. In addition, I have a vertical extension in the shape of a brass tube C with thread cut to fit the end of the spindle. Any ordinary clamp can be affixed to this, but the speed is thereby rather lessened.

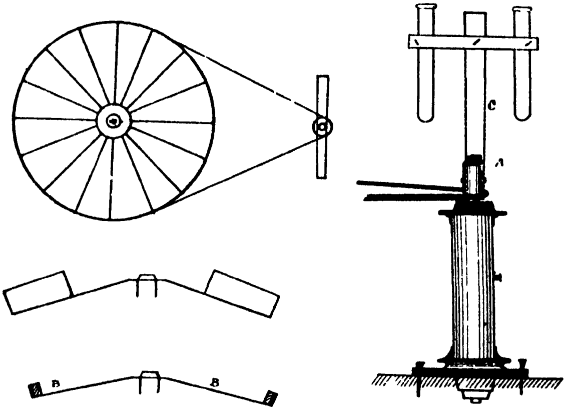


Fig 3

No laboratory is complete without a still for water, and indeed, considering the recent concessions of the revenue authorities, there is no excuse for a chemist not distilling his own water.

A still that can be made for half-a-crown is shown in Fig 4, consisting of a ½ cwt. glycerin tin to which is fitted a cork, covered with tin-foil to prevent organic contamination. A glass tube is bent, and continued to a glass worm, which can be obtained at any apparatus house. The worm, is fixed in a lard or butter bucket, the cold water entering at the bottom by a tube as shown. Three gallons are put in the tin, the first portion of the distillate being rejected if any ammonia is present in the original water. This apparatus looks decidedly crude, but I guarantee no better water can be produced. There are many stills on the market, and in some recent ones the condensation is effected by a conical cooling surface; I cannot speak from experience of these, but I accept the statement that water can be produced at ¾d. per gallon, *cum grano salis*. The one I use at present is, I think, as economical as any. Fig 5 A is a round copper boiler about 8 in. high and 8 in. in diameter, holding rather less than

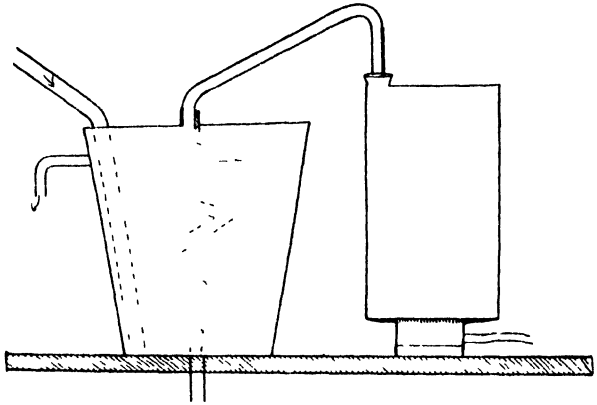
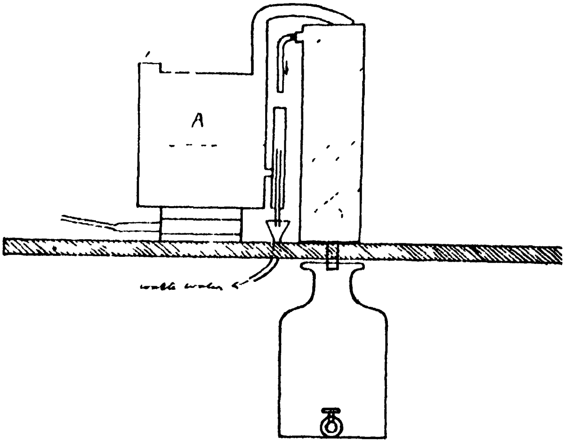


Fig 4

Fig 5



a gallon, thus escaping a licence. There are two orifices, one 1 in. diameter, and the other a bare ½ in.; at the side is seen the usual constant level device. The condenser is taller than usual—14in. by 6 in., and the worm is made of 9 ft. of block tin tubing of ½ in. clear bore. Cold water enters by a glass tube to the bottom of the condenser; the steam passing through the pipe heats the water at the top to a temperature of 95° C., while the bottom is cool; this is a higher temperature than in any still I have seen advertised. This hot water overflows back to the still, the excess passing down the central tube to waste. The greatest economy is effected by having the exit tube of the condenser branched as in Fig. 6. The cock A can be turned so that the inflow to the still only slightly exceeds the flow of distilled water from the worm; the excess drops over the side into the funnel, and thus to waste. When distilling water only, I do not keep the bottom of the condenser very cool, but allow the water to flow into the collecting bottle at a temperature of about 80° C., thus preventing largely any ammonia that might be present from condensing, besides saving gas. I have frequently used the still for some hours without any waste water flowing away, the flow into the still exactly equalling the amount of distilled water produced. With a small ring, burning 10 ft. per hour, I get a gallon in three hours; with a larger burner proportionately more. I do not believe any still will give more than a gallon per 30 cubic feet of gas consumed, and many stills require 40 ft.

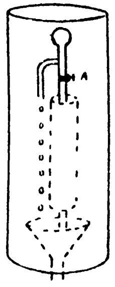


Fig 6

Every one has experienced the annoyance of a still or evaporating vessel running dry; or, perhaps, in the distillation of an aromatic water, the collecting vessel has "overflowed its banks," carrying the essential oil with it. Five shillings spent on an electric bell and Leclanché cell will obviate this. Fig. 7 shows the plan. A is the boiling or evaporating vessel, of any shape or

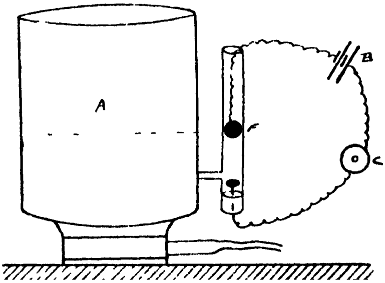


Fig 7

size; it is fitted with a side tube, as in the still. For existing vessels a neck of a broken distillation flask answers admirably. A cork is placed in the lower end of the tube, and through the cork a stout copper wire is passed; the height of this can be adjusted. F is a metallic float of some kind—either a hollow metallic ball or a halfpenny floated by cork, to which is soldered a very flexible wire or light chain. Connexions are made to the battery B and bell C, as shown; this bell may, of course, be situated anywhere. The action is self-evident. As the liquid evaporates the ball sinks, and eventually makes contact with the copper wire, the bell continuing to ring till attended to. There are innumerable extensions to this idea. I have been interested in the subject of wireless telegraphy, and have made a portable wireless receiver. The float connexions can be made to the primary of an induction coil; the discharge, giving out Hertzian waves, taking place from the secondary. The little receiver can be carried about the garden or taken with one, if necessary. Should the still or waterbath run dry the bell of the receiver will tinkle without fail.

The ordinary apparatus of a laboratory can be purchased as required. I give an approximate cost, but some items will vary, according to the position of the laboratory.

Partition, with door, etc.	£2	0	0
Wood for shelves, bench, trestles, and brackets	0	10	0
Gas and water fitting	1	0	0
Bottles and reagents	1	0	0
Still, complete	1	0	0
Apparatus, say	3	0	0

I do not include a balance, nor any of the usual pharmaceutical apparatus found in every chemist's shop.

In conclusion, I may say that a country pharmacist need not expect to make a fortune out of analytical work—a guinea here and five shillings there is perhaps all he will get. But, beyond that, a laboratory tends to keep one's own brains in order, and last, but not least, is fair treatment for any apprentice one may take.

The **President** said that the paper was full of useful matter, and he recommended it to members for very careful study.

Mr. J. R. **Hill** rejoiced that there were men like Mr. Pollard in their ranks. The paper was remarkable for its ingenuity.

Mr. **Bird** made some interesting remarks about the still described by the author. The suggestion to collect the distilled water hot was an excellent one. Not only was the quality of the distillate improved, but it kept better. He asked what Revenue concession was referred to by the author.

Mr. POLLARD, in a brief reply, said the concession he mentioned had been made within the last fortnight. He knew that in Ryde the chemists had been notified that no licence was required for a still of the capacity of one gallon when used for water only.

TRAGACANTH AND ACACIA: COMPARATIVE VISCOSITY OF THE SIMPLE AND MIXED MUCILAGES.

BY EDMUND WHITE, B.SC., F.I.C.

In making up a formula for a mucilage containing tragacanth and gum acacia it was noticed that the finished product was much less viscous than might have been expected from the proportions of the two gums present. As the formula contained several other ingredients it was at first supposed that one or other of these must have contributed to the result. It was, however, found by experiment that if mucilage of tragacanth be mixed with water and mucilage of acacia respectively the mixed mucilages are thinner than the corresponding mixture of tragacanth mucilage and water. The result was rather surprising, and no mention could be found of the fact in any of the text books of materia medica, pharmacy, or pharmacognosy.

I have also asked several pharmacists of large experience whether they have observed this phenomenon, and while none of them appeared to be familiar with it several could recall similar results, which had been attributed to other causes. The matter appears to be of some importance in relation to dispensing, especially in the case of compound tragacanth powder when used as a suspending agent in mixtures, and in the use of mixtures of tragacanth and acacia used in making emulsions. With other gums, like ghatti, which form glairy or viscous mucilages, the same result does not appear to be obtained.

The cause of the reaction is very obscure, and as my experience was gained only a few weeks before the date of this meeting, I am only able to record the facts as above stated. Perhaps some one present will be able to suggest an explanation, but if none is forthcoming it appears to be a problem which could very well be placed on the Research List of the Conference.

Mr. **Bird** said that some years ago he experimented with acacia and tragacanth, and found that acacia was a very good dividing agent for oils, tragacanth was a good suspending agent, and that a combination of the two give a very stable emulsion, but he had to use much more tragacanth than he expected.

The **President** expressed the hope that Mr. White would continue his investigations.

MERCURIC ZINC CYANIDE.

By D. B. Dott, F.R.S.E., F.I.C.

This substance is used to a considerable extent as an antiseptic in surgical dressings, having been introduced for that purpose by Lord Lister. For what we know of its chemistry we are principally indebted to Professor W. R. Dunstan. In his first paper (*Pharm. Journ.*, 20 [3], 653), Professor Dunstan describes the method used for the preparation of the double cyanide, as then approved by Lister. Twenty-four oz. mercuric cyanide and 12 oz. 171 grains of potassium cyanide were dissolved in four pints water; 27 oz. 139 grains of zinc sulphate crystals were dissolved in twelve pints water, and the two solutions mixed. The precipitate was then collected and washed with two quarts water. It may here be noted that the amount of water mentioned is not sufficient to completely wash the precipitate. Some of the compound (or mixture) prepared in this manner gave on analysis 17·77 per cent. of mercuric cyanide; and the compound used by Lister is elsewhere described as containing about 15 per cent. Dunstan found that by reducing water to a minimum a precipitate could be obtained containing 36·17 per cent,. of $Hg(CN)_2$. After describing several experiments, the opinion is arrived at that "only one [hypothesis] has stood the test of experimental verification, namely, that which supposes that the mercuric cyanide is mechanically retained by the zinc cyanide. With this hypothesis all the facts perfectly accord." As representing the proportions to be used, the equation is given :—

$$Hg(CN_2) + 2KCN = HgK_2(CN)_4$$
$$HgK_2(CN)_4 + ZnSO_4 = HgZn(CN)_4 + K_2SO_4$$

In *Pharm. Journ.*, 22 [3], 769, there is a communication by some author announcing that further experiment had convinced him that this double cyanide is really a definite compound, and that it consists of tetra-zincic-monomercuric decacyanide, mixed with more or less zinc cyanide. For fuller information we are referred to *Chem. Soc. Journal*, 1892, *Trans.*, 666. This is an elaborate paper, with much interesting matter and details of analysis, but whether it bears out the conclusion arrived at may be open to doubt. Some of the experiments are not very convincing, as when it is attempted to prove from the fact that zinc cyanide has no tendency to retain potassium sulphate, that it should therefore not be expected to retain mercuric cyanide; or, to use the professor's own words, "zinc cyanide has no tendency to entangle salts which are precipitated with it." Without attempting to review all the data given, it may suffice to say that the chief argument used to prove the existence of the tetra-zincic-monomercuric decacyanide is the observation that the proportion of mercuric cyanide retained by the precipitate diminishes as the water present increases; so that a double salt containing 38 per cent., or as little as 1 per cent., may be obtained by varying the proportion of water during precipitation. The maximum mercuric cyanide found was 38·5 per cent., and it was not found possible to increase this. Having regard to the fact that some decomposition must occur, and that, therefore, the substance will always contain some free zinc cyanide, it is held that the pure compound would contain somewhat more mercuric cyanide than the maximum actually obtainable, viz., 38·5 per cent. "The simplest molecular proportion, representing somewhat more than 38·5 per cent., is $Zn(CN)_2 \cdot \frac{1}{4}Hg(CN)_2$, or $Zn_4Hg(CN)_{10}$, which requires 40·65 per cent. of mercuric cyanide." By an ingenious plotting of curves, the number 40·5 is obtained, and is held to represent the percentage of mercuric cyanide which ought to be retained by the equimolecular mixture of the salts. 40·5 is "a number which agrees almost exactly with the percentage (40·65) required by the formula, $ZnHg(CN)_{10}$. It may, therefore, be safely concluded that this is the formula of the double salt."

Now, in the first place, the percentage of mercuric cyanide required by the above formula is not 40·65, but 35·0, so that any argument based on the number 40·5 falls to the ground. Secondly, if the percentage 38·5 is really obtained from a properly washed precipitate, a salt is indicated having a higher proportion of mercury than the tetra-zincic-monomeruric compound. In my own experiments I have not obtained more than 29·3 per cent. of $Hg(CN)_2$ in a washed and air dry precipitate, and when dried at 140° F. the percentage falls distinctly under. In actual practice the percentage easily varies from 29 to 23, and even to 21. Variations of temperature, of manner of mixing, of time of contact of the water with the precipitate, etc., caused marked differences in its composition.

There is no clear line of demarcation between intimate chemical compounds and more loosely combined molecular or merely physical combinations. Any number of salts may exist in theory, but there is no evidence that the tetra-zincic-monomercuric salt has ever been prepared, or that a combination approximating closely to that composition is readily formed. One might just as well insist that the precipitate should agree with the formula $Zn_6Hg(CN)_{14}$, or $Zn_8Hg(CN)_{18}$. There are many metallic compounds which vary appreciably according to the conditions of their formation, as the basic salts, ammonium, carbonate, etc., but all the same a normal composition is strongly indicated. There is no such thing with this so-called tetra-zincic-monomercuric cyanide. The evidence suggests that the substance in question should be called simply "zinc and mercury cyanide." It might be convenient to fix a definite proportion of mercuric cyanide, say, 20 per cent., but that would be quite an arbitrary matter. The precipitate has no fixed or definite composition.

Mr. GERRARD said that he agreed with Mr. Dott. He found that commercial samples varied from 18 to 35 per cent. of mercuric cyanide, mostly between 20 to 25 per cent. Variations in time, temperature, dilution, washing, and other physical conditions influence the resulting product, so that constancy was unattainable.

Mr. UPSHER SMITH also agreed, and said this was the most popular surgical antiseptic at present in use.

ARSENIOUS IODIDE: NOTES AND CRITICISMS.

By R. C. Cowley and J. P. Catford.

The unsatisfactory character of much of the commercial article has been commented on in various communications and discussions, notably at two of the Edinburgh evening meetings held on January 18, 1893, and December 23, 1903. As we have been investigating the subject recently, and our conclusions differ in many respects from those we have hitherto seen published, we venture to submit them for consideration by pharmacists. All the methods practically used to prepare this iodide may be regarded as comprised in the two ways alluded to in 1885 Pharmacopœia monograph; the method adopted by Meurer and others—decolorising an alcoholic solution of iodine with arsenuretted hydrogen—may be passed over without comment Preparation by sublimation of the elements, as described in C. L. Bloxam's *Chemistry*, is not likely to be adopted by pharmacists, nor fusing them together as formerly ordered in the U.S. Pharmacopœia.

Various solvents for the iodine have been proposed, such as boiling ether, CS_2, alcohol, etc., involving needless trouble and expense, besides producing other reactions impairing the quality and quantity of the desired product. Whether one starts with the elements or with As_2O_3 and HIAq, when properly conducted the result is the same—

$$\left.\begin{array}{l}3(OH_2)\\ \\ As_2 + 3I_2\end{array}\right\} = As_2O_3 + 6HI = \left\{\begin{array}{l}3(OH_2)\text{ evaporated}\\ \\ 2AsI_3\text{ residual product.}\end{array}\right.$$

—or independently of atomic theory and expressed in simple combining proportions by weight, both methods are comprised in our diagram as follows:—

$$33\left\{\begin{array}{c}\overbrace{\begin{array}{cc}O & H\\ 8 & 1\end{array}}^{9}\\ \\ \underbrace{\begin{array}{cc}25 & 127\\ As & I\end{array}}_{152}\end{array}\right\}128$$

Very pure iodide of arsenic may be easily prepared as follows:

—Powdered arsenium, 10; resublimed iodine, 51; distilled water, 200. Mix the solids with a few drops of the water into a paste in a shallow dish, pour on the remainder of the water, and without stirring, digest at a gentle heat, on a water-bath, for about half an hour; then evaporate quickly with constant stirring to complete dryness. The product should not differ so much as 1 per cent. from the combined weights of the solid materials used—i.e., no loss of iodine, and no oxide or uncombined arsenium in the product.

The arsenium should be pure, and the iodine above the B.P. requirement, as any cyanide of iodine (or iodide of cyanogen), Cl or Br, would cause loss of iodine, if not of arsenic, and fixed impurities would, of course, remain in the product. Ordinary commercial iodine is not suitable even if an extra quantity be used, unless the only impurity in it were water, but in actual fact that is by no means the case.

The iodine dissolves, without stirring, twice as fast as the arsenium becomes oxidised, owing to the solubility of iodine in hydriodic acid, forming a deep red layer under the water which protects the HI from the action of atmospheric oxygen. If too much heated (before sharing the elements of water with the arsenium, and becoming, virtually, the comparatively non-volatile HI) uncombined iodine would be driven off and uncombined arsenium remain. On the other hand, it would be still worse to leave it unfinished for hours; arsenious oxide would deposit, the HI in solution would be oxidised and iodine liberated again which would not recombine with the As_2O_3 when attempting to evaporate the liquid to dryness. Consequently the product may be made to contain both As_2O_3 and free iodine, in which case its solution would be yellow even when dilute, and would turn starch blue unless $NaHCO_3$, had been previously added, as in the usual process for titrating As_2O_3 when an amount of trioxide (present as impurity) proportional to the free iodine would be converted into pentoxide before the titration commenced. Of course, this would not be reckoned in the estimated percentage. Even when there is no uncombined iodine, this preparation so commonly contains As_2O_3, one might say usually, that we must decidedly differ from the advocate of the standard iodine titration as to its reliability, compared with gravimetric determination of both I and As, or at least of the former combined with titration of the arsenium in cases where samples are proved to be free from uncombined iodine. AsI_3 made as above and the iodine purified by sublimation (from a little KI, as usual) prevents any error in the gravimetric assay from calculating AgCl as AgI.

As the same quantity of iodine is required to convert thirty-three parts of As_2O_3 into As_2O_5 as for 152 of AsI_3, it is evident that any amount of impurities in a sample might pass undetected by the person who relied on the iodine titration alone, if only about one-fifth of the impurity consisted of As_2O_3.

At both the Edinburgh meetings the favourite method for preparing AsI_3 appears to have been that in which KI and HCl are employed; and dissolving out the AsI_3 from the potassium chloride by means of CS_2. The formula in the 1904 *Year-Book* appears to have a typographical error in the quantity of KI ordered, but even correcting that we did not succeed in obtaining one-half of the theoretical yield. Not having seen any published report of the proportion obtained by others, we merely say that it appears to us a messy, wasteful process. If the excess of HCl be omitted in order to be able to evaporate to dryness before extracting with CS_2, then the potassium (and the arsenic ?) is shared between the HCl and the HI. In a trial of a small quantity, instead of 4·5 Gm. of AsI_3 only one-third (1·5 Gm.) was extracted by an ounce of CS_2, a costly process, product dubious as to quantity and quality. We found it far better to substitute for the HCl a concentrated solution of tartaric acid, exactly sufficient to remove the alkali base from the sphere of action, and then dissolve the As_2O_3 in the filtrate. Unfortunately, alcohol could not be used to remove the last trace of tartar, as it, like most organic solvents, in the presence of water would react with HI, liberating iodine during evaporation to dryness. So that to free the product from the small proportion of potassium salt it is still necessary to recrystallize from CS_2; but as an alternative method where arsenium is not at hand, this is, in our experience, the next best method; that is assuming there is no ready-made hydriodic acid available, and pharmacists are not likely to stock it (twice) nor to prepare it from text-book directions; yet the preparation of AsI_3 from HI and As_2O_3 would be an ideal method, notwithstanding Mr. Dott's figures to the contrary—his product containing only 72·73 per cent. instead of 83·55 per cent. of iodine. We notice that for 2·8 Gm. As_2O_3 were used, only 64 c.c. of 11 per cent. HI. Now 2·8 Gm. As_2O_3 require 10·86 Gm. HI, or 98 Gm. of 11 per cent. solution. The specific gravity, not given in the report, being about 1·09 there would be required 90·5 c.c. of 11 per cent. hydriodic acid instead of the 64 c.c. actually used. This would exactly account for the deficiency of iodine in his product. A sample made by us with HIAq titrated with standard NaOH and showing 45·7 per cent. HI (specific gravity about 1·5, yielded within 1 per cent. of the theoretical product, so that we cannot agree "that the alternative method referred to in the Pharmacopœia (1885) does not yield a salt of the composition required"; nor do we agree with the inference "that this is an instance in which it would be better for the Pharmacopœia not to refer to the methods of preparation, but rather to content itself with giving sufficient tests for purity." That the Pharmacopœia should give *sufficient* tests for purity we hope we have contributed some good reasons in this paper, but as to "not referring to methods of preparation"—and the compilers of 1898 appear to have followed this advice, inasmuch as they have omitted reference to the alternative method with hydriodic and arsenious acids—are not the different committees appointed for the purpose of practically investigating and comparing various methods ? and not to take on trust the work of any one else, however eminent and able, remembering that *humanum est errare* ; even such a-high authority as the Editor is responsible for asserting that the aqueous solution (of AsI_3) "has a neutral reaction."

Considering, then, that this is a pharmaceutical preparation scarcely used by any but pharmacists, and too often supplied to them badly made, for the sake of those who would like to prepare it *comme il faut*, the information about it in ordinary reference books being conflicting, meagre, and unsatisfactory—we unhesitatingly say it is an instance where not merely reference to methods of preparation should be given, but the best and most convenient working formula should be given, in detail, in the Pharmacopœia.

It seems rather inconsistent that in the same standard work, in which it is contemplated to insert elaborate tests for detecting almost infinitesimal proportions of arsenic in non-arsenical, yet the arsenical preparations themselves are so indifferently treated that the proportion of arsenic in many of them may be almost anything so far as any check is provided. The B.P.C. are asking for a method for determining the arsenic in ferri arsenas, but, would it not be as well to first find out how to make it properly ?

Arsenious iodide of excellent quality *is* commercially obtainable. We have had submitted for examination a sample made by a firm second to none in this country in repute for pure chemicals. The results of careful analysis were :—

Found	Iodine	82·73 per cent.	83·55	AsI_3 by calculation
	Arsenium	17·04 ,,	16·44	
		99·77 ,,	99·99	
	Undetermined	0·23 ,,		
		100·00 ,,		

one per cent. of As_2O_3 in the sample would mean 0·24 per cent. of oxygen.

$$\begin{array}{rl} \text{Iodine} & \left.\begin{array}{l}82{\cdot}73\\16{\cdot}28\end{array}\right\} = 99{\cdot}01\ \text{AsI}_3 \\ 17{\cdot}04\ \text{Arsenium}\left\{\begin{array}{l}16{\cdot}28\\0{\cdot}76\end{array}\right. & \left.\begin{array}{l}0{\cdot}76\\0{\cdot}24\end{array}\right\} = 1{\cdot}00\ \text{AsO}_3 \end{array}$$

As a commercial article it may be fairly regarded as up to an acceptable standard of purity for pharmaceutical purposes.

Notwithstanding what has been recently asserted to the contrary, the proportion of iodine ordered in Donovan's original formula for his solution (*P.J.*, **1**, 425, and **2**, 469, 1842) is not in excess of what is required to combine with the other elements; in fact, if calculated by the atomic weights of the present B.P., the proportion of iodine required is 50·304 instead of the 50 ordered. The additional ¼ grain of hydriodic acid (not "free iodine") per fluid ounce of the solution served to dissolve any oxidised arsenium, of almost constant occurrence in all but recently sublimed arsenium. Careful perusal of the original articles shows that Donovan himself looked on the presence of free or uncombined iodine as a fault; nor is there anything in the present Pharmacopœia to justify its presence. But, perhaps, it may have been the origin of the peculiar error as to the behaviour to litmus; a sample with free iodine may have left blue litmus paper still blue. The new U.S.P. reproduces the erroneous statement as to neutrality of solution.

Mr. J. R. Hill said he knew Mr. Duncan had obtained perfectly pure and stable crystals by recrystallization from carbon disulphide. These had been in his possession some years and remained quite unchanged.

REPORT UPON THE RESULTS OBTAINED FROM THE ANALYSIS OF PHARMACEUTICAL PREPARATIONS, BY THE ANALYSTS OF THE POOR-LAW UNIONS OF IRELAND IN THE YEAR ENDED MARCH 31, 1905.

By J. E. BRUNKER, M.A. (Dub.)

I had the honour of communicating to the Conference which met at Sheffield last year certain tables which showed the average results obtained from the analysis of the galenical preparations of the Pharmacopœia supplied during two years for the service of the Medical Charities of Ireland.

As many pharmacists now take an interest in this subject, I have thought it well to follow up those tables with the experience of another year.

The tables now communicated form a portion of my official report to the Local Government Board for Ireland for the year ended March 31 last.

I have no remark to make upon the figures shown, except to note a fractional reduction in the percentage of alcohol found in some of the tinctures, etc.

This reduction was traced to one source. The contractor in a few instances only allowed his preparations to fall below the minimum standard, but his supplies were found rather frequently to fall below the normal alcohol value.

The incident illustrates how sensitive averages are to any exceptional influence; and, further, proves that there is now no practical difficulty in the way of arriving at normal figures.

TABLE A.—TINCTURES.

TINCTURES.	No. of Samples.	Defective as to				Extractive Grammes in 100 c.c.			Alcohol by Volume.			Observations.
		Extractive.	Alkaloids and Chemical Constituents.	Alcohol.	Totals.	L.G.B. Minimum, Standards.	Averages of all Samples.	Average of Normal Samples only.	L.G B Minimum Standards.	Averages of all Samples.	Averages of Normal Samples only.	
Aconiti	8	—	—	—	—	1·2	1·45	1·45	65·0	66·9	66·9	
Asafetidæ	3	2	—	—	2	10·0	5·32	10·1	65·0	70·6	70·6	
Aurantii	56	1	—	—	1	1·8	2·09	2·14	72·0	74·0	74·0	
Belladonnæ	35	—	—	—	—	0·5	0·8	0·18	57·0	59·0	59·0	
Benzoini Comp.	35	5	—	—	5	16·5	18·0	18·43	73·0	74·0	74·3	
Buchu	39	—	—	—	—	3·5	3·76	3·76	55·0	56·16	56·16	
Calumbæ	101	2	—	2	4	0·9	1·13	1·14	53·0	55·4	55·2	
Camphoræ Comp.	456	—	—	—	—	0·33	0·37	0·37	57·0	58·5	58·5	
Cannabis Indicæ	2	—	—	—	—	3·5	3·79	3·79	87·0	86·7	86·7	
Cantharidis	2	—	—	—	—	0·15	0·22	0·22	85·5	90·0	90·0	
Capsici	32	—	—	—	—	1·0	1·25	1·25	66·0	68·0	68·0	
Cardamomi Comp.	136	3	—	3	6	6·0	7·16	7·2	54·0	55·4	55·5	
Catechu	42	3	—	—	3	15·0	16·0	16·6	50·0	52·15	52·0	
Chloroformi et Morphinæ	67	8	—	—	8	30·5	31·8	32·2	44·0	45·0	45·0	
Cinchonæ	95	—	10	3	13	7·5[1]	6·0	6·0	63·0	64·6	64·6	[1] Maximum.
Cinchonæ Comp.	90	—	7	2	9	4·3	5·17	5·17	63·0	65·0	65·0	
Colchici Sem.	6	1	—	—	1	2·25	2·92	3·14	41·0	42·3	42·3	
Digitalis	179	1	—	1[2]	2	3·0	4·0	4·0	53·0	54·7	54·4	[2] Excess.
Ergotæ Ammoniatæ	9	—	—	—	—	3·5	4·42	4·42	51·0	52·6	52·6	
Ferri Perchloridi	158	—	8[3]	—	8	—	—	—	22·0	23·1	23·1	[3] Fe.
Gelsemii	9	—	—	—	—	1·0	1·3	1·3	53·0	56·3	56·3	
Gentianæ Comp.	202	7	—	4	11	4·7	5·38	5·4	41·0	42·4	42·5	
Guaiaci Ammoniata	6	1	—	—	1	13·0	14·8	15·37	70·0	73·57	73·57	
Hydrastis	12	—	—	1	1	2·0	2·24	2·24	55·0	56·11	56·6	

TABLE A.—TINCTURES (*continued*).

TINCTURES.	No. of Samples.	Defective as to				Extractive Grammes in 100 c.c.			Alcohol by Volume.			Observations.
		Extractive.	Alkaloids and Chemical Constituents.	Alcohol.	Totals.	L.G.B. Minimum, Standards.	Averages of all Samples.	Average of Normal Samples only	L G.B. Minimum Standards.	Averages of all Samples.	Averages of Normal Samples only.	
Hyoscyami	117	10	—	—	10	2·7	2·75	2·85	42·0	44 0	44·0	
Iodi	51	—	3[4]	1	4	—	—	—	85·0	85·7	86·0	[4] Iodine.
Jaborandi	9	1	—	—	1	3·0	3·66	4·22	41·0	44·15	44·15	
Jalapæ	6	—	—	—	—	3·5	4·67	4·67	66·0	66·9	66·9	
Kino	7	—	—	—	—	19·0	24·6	24·6	45·0	49 0	49·1	
Lavandulæ Comp.	13	—	—	—	—	0·4	0·63	0·63	87·0	88·4	88·4	
Lobeliæ Ætherea	13	—	—	—	—	1·0	1·76	1·76	62 0	63·8	63·8	
Myrrhæ	8	—	—	—	—	4·5	5·54	5·54	83·0	83·9	84·4	
Nucis Vomicæ	157	—	10[5]	—	10	2·0	2·8	2 8	62·0	64·2	64·2	[5] 9 Excess.
Opii	136	—	—	1[6]	1	3·0	3·68	3·68	42·0	43·8	43·8	[6] 1 Deficiency
Podophylli	4	—	—	—	—	3·5	3·38	3·64	86·0	87·9	87·9	
Quininæ	35	—	1	—	1	3·2	3·8	3·8	72·0	73·5	73·5	
Quininæ Ammoniata	50	—	—	—	—	—	—	—	52·0	54·0	54·0	
Rhei Co.	65	2	—	1	3	14·8	15·7	16·0	48·0	50·4	50·5	
Scillæ	122	4	—	3	7	10·0	12·5	12·6	51·0	53·3	54·0	
Senegæ	103	7	—	1	8	6·0	6·37	6·4	54·0	55·5	55·4	
Sennæ Comp.	14	1	—	2	3	9·0	10·16	10·36	38·0	38·7	39·6	
Stramonii	8	2	—	—	2	3·8	3·8	4·0	41·0	42·6	42·6	
Strophanthi	5	—	—	—	—	0·45	0·72	0·72	66·0	67·35	67·35	
Valerianæ Ammon.	17	—	—	—	—	3·5	3·7	3·82	52·0	53·6	53·6	
Zingiberis	47	—	—	1	1	0·4	0·54	0·54	87·0	88·5	88·5	
Total	2,767	61	39	26	126	—	—	—	—	—	—	

TABLE B.—LIQUORS.

LIQUORS.	No. of Samples.	Defective as to			Extractive Grammes in 100 c.c.			Alcohol by Volume.			Observations.
		Extractive.	Alcohol.	Totals	L G B. Minimum Standards	Averages of all Samples	Averages of Normal Samples only.	L.G.B. Minimum Standards.	Averages of all Samples.	Averages of Normal Samples only.	
Calumbæ Conc. . . .	78	—	—	—	3·3	4·38	4·17	18·0	19·5	19·0	
Hamamelidis . . .	9	—	—	—	0·03	0 05	0·05	16·0	18·0	18·0	
Iodi Fortis	17	1[1]	—	1	—	—	—	70·0	72·7	72·7	[1] Excess.of Iodine
Picis Carbonis . . .	7	1	—	1	2·75	3 7	4 0	80·0	81·4	81·4	
Quassiæ Conc. . . .	53	—	—	—	0·25	0·43	0·43	18·5	19·5	19·5	
Rhei Conc.	14	2	—	2	10 0	12·73	13·0	17·0	18·0	18·0	
Sarsæ Conc.	5	—	—	—	9·0	14·23	14·23	19·0	21·3	21·3	
Senegæ Conc. . . .	69	2	—	3	10·0	11 4	11·6	21·0	22·5	22·5	
Sennæ Conc. . . .	9	—	1	—	11·0	15·7	14·6	18·0	19 8	19·8	
Total	261	6	1	7	—	—	—	—	—	—	—

TABLE C.—LIQUID EXTRACTS.

LIQUID EXTRACTS.	No. of Samples.	Defective as to				Extractive Grammes in 100 c c.			Alcohol by Volume			Observations.
		Extractive.	Alkaloids.	Alcohol.	Totals.	L G B. Minimum Standards	Averages of all Samples.	Averages of Normal Samples only	L G B. Minimum Standards	Averages of all Samples.	Averages of Normal Samples only.	
Cascaræ Sagradæ	226	5	—	—	5	21·0	23 67	23·8	17·0	18·3	18·3	
Ergotæ . . .	103	—	—	2	2	12 0	15 3	15·0	30·0	31·2	31·4	
Glycyrrhizæ .	19	8	—	—	8	38·5	39·4	40·7	17·0	18·0	18·0	
Opii	6	—	—	—	—	—	3·03	3·03	17·0	18·6	18·6	
Total . .	354	13	—	2	15	—	—	—	—	—	—	—

GENERAL BUSINESS

THANKS TO THE MAYOR.

Dr. **Attfield**, called upon by the President, proposed that a very hearty vote of thanks be accorded to the Mayor of Brighton, Mr. Alderman F. Blaker, J.P., for his great kindness in so warmly receiving the members of the British Pharmaceutical Conference. He said the Mayor's kindness in coming to welcome the Conference the previous day had already been alluded to, but he desired to bring the matter forward again, because the Mayor had not only done the Conference a great service as well as kindness in welcoming the members to Brighton, but he had shown his interest by coming in the middle of each day for luncheon, and had thus identified himself with the Conference, representing not only the pharmacists of the town, but the town itself. Dr. Attfield then referred to the constitution and objects of the Conference, which was founded in 1863, and first visited Brighton in 1872. One of its two aims was "the encouragement of pharmaceutical research," the other was "the promotion of friendly intercourse amongst pharmacists." In alluding to the friendly feeling and good-fellowship engendered by the meeting of the Conference in various parts of the country, he showed that the courtesy invariably extended by municipal authorities wherever the Conference was held greatly aided in the hitherto successful accomplishment of its second object. The Mayor of Brighton had much helped the Conference in this way, and his efforts deserved and would receive the heartiest recognition of the members.

Dr. **Symes** seconded the vote of thanks to the Mayor, speaking in appreciative terms of the right royal welcome Brighton had accorded to the Conference. He referred to the Mayor's association with the sanitary authority of Brighton, which had no doubt given him a considerable amount of sympathy with the objects of the Conference, inasmuch as sanitary and pharmaceutical matters were allied in some measure.

The **President** put the motion to the meeting, and it was carried with enthusiasm.

The **Mayor**, in reply, thanked the Conference for the cordial manner in which the vote of thanks had been assented to, and spoke in high terms of the work of the Local Committee. Personally it had been quite a privilege to have been associated with so many of those engaged in pharmacy—he had found some splendid fellows among them, and he should look forward with interest to meeting them again during his travels to other parts of the country. Dr. Symes had referred to his connection with sanitation. He had been a member of the sanitary authority of Brighton for twelve years, and he had seen many changes, and all in the right direction. One of the last things he did was to pilot a movement to induce the Council to give a grant of £500 a year towards fighting that terrible scourge consumption, which must be recognized and grappled with as a foul disease. He was glad to say the Council made the grant, and, though £500 was not a large sum for a town like Brighton, they had recognized the principle that something must be done.

THE BELL AND HILLS FUND

The PRESIDENT said he had now the very pleasant duty of presenting to the local pharmaceutical association a gift of the following books from the Bell and Hills Fund, and hoped they would be carefully kept and read :—

Art of Dispensing.
Perkin and Kipping's *Organic Chemistry.*
Strasburger and Hillhouse's *Botany.*
Ince's *Latin Grammar.*
Allen's *Chemistry of Urine.*
White and Humphrey's *Pharmacopedia.*
Green's *Botany,* 2 vols.
Hoblyn's *Dictionary of Medical Terms.*
Squire's *London Hospitals' Pharmacopœia.*
Dun's *Veterinary Medicine.*
Quain's *Dictionary of Medicine.*
Harrington's *Practical Hygiene.*

Mr. GIBSON said : Mr. President, I beg to thank you very much for the kind words you have uttered in presenting this beautiful set of books. I am convinced they will be of good service not only to the men of the present time, but to those who are to follow. I distinctly remember thirty-three years ago we had a similar present. Those books have been well read and well preserved ; they have been of the greatest benefit to the chemists of Brighton for many years, and when we add these new books they will form a library which we shall be proud to have. They will be well cared for, and will be read with great benefit, and we hope and sincerely trust that when the Conference visits Brighton again you will be able to add to them.

PLACE OF MEETING FOR 1906

Mr. **GERRARD**, in the course of an eloquent speech on behalf of the chemists of the Midlands, invited the Conference to visit Birmingham in 1906. It would, he said, be a great change from "Beautiful Breezy Brighton," but if they came to Birmingham they would still have the three B's—"Busy Beehive Birmingham." He spoke of the beauties and historic interest of the surrounding country, and expressed the hope that the invitation would be accepted.

Mr. C. **THOMPSON**, who, as Mr. Gerrard explained, was the Secretary of the Local Committee when the Conference visited Birmingham nineteen years ago, seconded the invitation, and, on behalf of the ladies of Birmingham, asked the ladies of the Conference to visit them next year. At the Belfast and Dublin Conferences the cry of the Irishmen was "We will do our best"—he would only add one word to that, and say "We will do our very best."

Mr. **ATKINS** moved that the invitation from Birmingham be accepted. He recalled two previous Conferences at Birmingham, in 1865 and 1886, at which he was present, and said he thought it was Thackeray who stated that all great events required to have a rehearsal. Birmingham had had two rehearsals, and he was sure that if the invitation was accepted they would have a right royal reception.

Mr. **NEWSHOLME** in seconding the resolution, remembered that he attended a Conference in Birmingham eighteen years ago. He had very pleasant recollections of that city: their Brimingham friends had been very kind to them.

The invitation to Birmingham was unanimously accepted.

Mr. **KEMP** then proffered an invitation to Manchester for the Conference of 1907. He was aware that it was forbidden to the Conference to bind itself so far in advance, but he took it that, if members were agreeable, now, to accepting it, it was more than likely that at the next Session they would express the same opinion. Continuing, he made a humorous comparison between Belfast, Glasgow, and Manchester, and referred to shipping and the various industries to be visited in Cottonopolis. He regretted the absence of the President of the Manchester Pharmaceutical Association, Mr. Woolley.

The **PRESIDENT** thanked Mr. Kemp for the invitation.

THANKS TO THE LOCAL COMMITTEE.

Mr. R. A. ROBINSON, President of the Pharmaceutical Society, proposed the following resolution :—

That a most cordial vote of thanks be accorded to the ladies and gentlemen of the Local Committee for their exertions in bringing the Brighton meeting to such a successful issue.

Mr. Robinson referred to the Ladies' Committee, and said how much they were obliged to all of them for the care they had taken of the lady visitors, and, in fact, some of the men visitors. They all knew Mr. Gibson, the Chairman, and what he was capable of doing. They also knew that he had had very valuable assistance from Mr. Savage and Mr. Yates, the Hon. Local Secretaries. Mr. Robinson referred to the able manner in which the detail work had been arranged, and instanced the arrangements for special trains. He did not think he could pay a better compliment to the Brighton Committee than by repeating what he had heard said by a distinguished visitor, "Couldn't we come to Brighton every year ?"

Mr. GLYN-JONES, in seconding the resolution, said it was always very difficult to supplement anything Mr. Robinson said, for the President of the Pharmaceutical Society did his part of the work so thoroughly. All that he could say was that the arrangements had been perfection.

The resolution was unanimously carried.

Mr. GIBSON, in replying, said the Brighton Committee had been more than amply repaid for their trouble. The work of preparation had been a pleasure to the Executive, and the Chairmen of the three Committees had thrown great zeal into their work. He recalled the previous visit of the Conference to Brighton, and mentioned that in the photograph taken only two ladies appeared, whereas in the photograph of this year's meeting there would be quite a hundred.

Mr. SAVAGE, in a happy speech, said the Brighton Committee had had in view the desire to make the "Queen of Watering Places" the best place to visit.

Mr. YATES also replied in a few well-chosen words.

ELECTION OF OFFICERS.

Mr. DRUCE proposed and Mr. IDRIS seconded that the following be elected officers for the ensuing year :—President, W. A. H. Naylor, F.I.C., F.C.S.; Vice-Presidents, R. A. Robinson, W. F.

Wells, D. B. Dott, Professor Greenish, F. Ransom, Thos. Barclay; Hon. Treasurer, J. C. Umney; Hon. Secretaries, E. Saville Peck and Edmund White; Hon. Local Secretary, Charles Thompson; Executive: F. C. J. Bird, H. W. Gadd, D. Lloyd Howard, W. H. Martindale, J. F. Tocher, F. H. Alcock, W. W. Savage, R. Wright, A. W. Gerrard; Auditors: J. W. Bowen and W. P. Robinson.

The motion was carried.

- - -

CLOSING VOTES OF THANKS.

Mr. J. C. UMNEY proposed a vote of thanks to the Editor of *The Pharmaceutical Journal* for the bound volumes of the papers which had been supplied, and congratulated Mr. Humphrey on his return to good health.

Mr. PECK, in seconding the motion (which was heartily carried), said the Editor had been exceedingly kind not only to compile the book but also to collect the papers. The fact of having the papers in this form greatly helped discussion.

Mr. WELLS moved "That the Conference place on record its appreciation of, and thanks for, the extremely able way the President, Mr. W. A. H. Naylor, had conducted the business of the Conference meetings."

Mr. RUTHERFORD HILL seconded.

Dr. ATTFIELD having put the motion (which was carried) to the meeting,

The PRESIDENT briefly replied.

THE SOCIAL GATHERINGS.

Monday, July 24.

THE RECEPTION AT THE ROYAL PAVILION.

On Monday evening the Mayor and Mayoress of Brighton (Alderman and Mrs. Frederick Blaker) brilliantly inaugurated the forty-second annual meeting with a reception at the Royal Pavilion. About four hundred guests were present, the Mayor having invited a number of representative residents of Brighton and Hove to meet the members of the Conference. The Mayoress,

unfortunately, could not be present, but her duties were charmingly fulfilled by her little daughter, Miss Minnie Blaker.

The rooms of the Royal Pavilion were beautifully decorated with flowers, and the grounds tastefully illuminated. The band of the Royal Marine Artillery played a selection of music on the Eastern Lawn, which was much enjoyed, the evening being fine and warm, thus rendering a promenade in the grounds very agreeable.

About 10 o'clock dancing commenced in the Music Room, under the direction of Messrs. A. J. Franklin, J. Padwick, C. E. Robinson, and G. B. Savage, while two drawing-rooms were set aside for refreshments. At intervals during the evening Madame Ennis Carmen beautifully rendered a selection of songs in the Banqueting Hall, which were much appreciated by the large company present.

The whole proceedings passed off most enjoyably, and reflect the greatest credit upon those responsible for their arrangement.

Tuesday, July 25.

At the close of the afternoon meeting the members adjourned to the West Pier, where afternoon tea was served on the Pavilion Terrace, music being provided by the band under the direction of Mr. Dunlop.

In the evening a concert and dance were held at the Hotel Métropole. The gardens were tastefully illuminated by lanterns lent by Mr. W. H. Gibson. Dancing took place in the ballroom, music being provided by the band of the Hôtel Métropole. The spacious corridors were utilized as a promenade, while in the conservatory an attractive concert programme was carried out under the direction of Mr. W. A. Lauder, and much enjoyed by the company present.

During the day the enjoyment of the ladies visiting the Conference was amply provided for by the Ladies' Committee. Visits were made to the Picture Gallery, Museum, and Royal Pavilion, and in the afternoon to Booth's Museum of British Birds. There was also a motor-car trip to the electricity works of the Brighton Corporation at Southwick.

Wednesday, July 26.

In the morning a drive was arranged for the ladies through the most attractive parts of Brighton and Hove.

At the close of the afternoon proceedings two excursions were provided. One party drove in carriages to Devil's Dyke, where tea was served, while another went by steamboat to Eastbourne. On arrival the party was welcomed by the Mayor of Eastbourne (Councillor Simmons), and high tea was served at the Queen's Hotel. After tea there was a most enjoyable drive arranged by the chemists of Eastbourne, to whose kindness the visitors were much indebted, as they were thus enabled to visit the town and its charming surroundings in the limited time available. At 8.30 the party re-embarked for Brighton, the weather having been gloriously fine. After passing Beachy Head, however, the steamer ran into a sea-fog, which persisted during the whole of the return journey, and naturally the boat reached Brighton later than was anticipated. The two parties then joined forces, and finished the evening with a smoking concert at the Hôtel Métropole, which was admirably carried out under the genial presidency of Mr. J. R. Gwatkin.

Thursday, July 27.

EXCURSION TO ARUNDEL.

At 10 o'clock the members of the Conference left Brighton station by special train for Arundel, which was reached shortly after 11 o'clock. The party, numbering nearly 300, proceeded at once to Arundel Castle, which, by the kindness and courtesy of the Duke of Norfolk, had been thrown open for their inspection. Luncheon was served at the Norfolk Hotel, Mr. W. H. Gibson, chairman of the Local Committee, being in the chair. After the loyal toasts had been duly honoured, the chairman proposed the health of the Duke of Norfolk, referring in felicitous terms to the kindness of his Grace in allowing them to visit the castle and its charming grounds. The Duke had written him a very kind and courteous letter regretting that he was unable to be at Arundel that day. He therefore begged to couple the toast with the name of Lieut.-Colonel Mostyn, who was representing the Duke of Norfolk there that day. Lieut.-Colonel Mostyn, in responding, said he was sure it gave his Grace the greatest pleasure to afford them the opportunity of visiting Arundel Castle, and he trusted the Conference would spend a pleasant day at Arundel.

Councillor Milner Black, in a very neat speech, proposed the health of the President of the Pharmaceutical Conference, to which Mr. W. A. H. Naylor replied, dwelling feelingly upon the great kindness with which the Conference had been received at Brighton.

Mr. S. R. Atkins proposed "The Ladies" in his well-known courtly and polished style. His speech was distinguished by a delicate shade of humour, which enabled Mr. G. C. Druce, who responded for the ladies, to display similar talents in a manner highly appreciated by his audience.

After luncheon there was a delightful drive through the park and Fairmile Bottom, returning through Slindon. Others went for a trip up the river Arun by steam launch. All met again for tea at the Norfolk Hotel, a photograph of the party being afterwards taken in the Castle grounds.

The return journey was made to Brighton by special train, after a most enjoyable day, which had been spent in the midst of delightful surroundings and favoured with perfect summer weather.

INDEX

A.

Abies amabilis, Essential Oil of, 122.
Abies amabilis, Oleoresin of, 171.
Acacatechin, 57.
Acacia and Tragacanth, Comparative Viscosity of the Simple and Mixed Mucilages of, 485.
Acacia concinna in Burma, 179.
Acacia farnesiana in Burma, 180.
Acacia farnesiana in Cuba, 293.
Acacia Mucilage (Pinchbeck), 225.
Acacia verek, *A. kirkii*, *A. seyal*, *A. spirocarpa*, *A. arabica*, *A. stenocarpa*, *A. usambarensis*, *A. stuhlmannii* and *A. verugea* in German East Africa, 202.
Acetic Acid for Skin Application, 293.
Acetic Acid Ointment, 293.
Acetic Acid Paste, 293.
Acetic Extract of Belladonna Leaf (Dohme), 226.
Acetic Extract of Colchicum Seeds (Dohme), 226.
Acetic Extract of Digitalis (Dohme), 226.
Acetic Extract of Lobelia (Dohme), 227.
Acetic Extracts (Dohme), 226.
Acetopyrine, 171.
Acetylmethylcarbinol in Commercial Vinegar, 166.
Acid Acetic for Application to the Skin, 293.
Acid Acetic Ointment, 293.
Acid Acetic Paste, 293.
Acid Boric, Detection of, with Mimosa Flower Tincture, 50.
Acid Boric Dressings, Assay of, 229.
Acid Carbolic and Soft Soap Sheep Dip, 299.
Acid Carbolic Dressings, Assay of, 230.
Acid Carbolic, in Hypodermic Injections, 181.
Acid Carbolic Ointment, 288.
Acid Carbolic Salve (Bayne), 296.
Acid Cecropic, 58.
Acid Formic for Muscular Trembling, 193.
Acid Formic, New Reaction for, 15.
Acid Gynocardic, Pills, 242.
Acid Hydriodic, Glycerol of (Kirchgessner), 256.
Acid Hypophosphorous in Dispensing, 257.
Acid Infusion of Cinchona, Concentrated (Cripps), 443.
Acid Phosphoric, Determination of, in Food, (Fleurent), 129.
Acid Picramic, New Process for Preparation of, and Determination of K. with, 130.
Acid Picric for Chilblains, 316.
Acid Picric for Determination of Antipyrine, 22.
Acid Quinine Hydrochloride, 419.
Acid Ricinoleic, 475.
Acid Salicylic and Aniline Colours, Detection of, in Foods, 22.
Acid Salicylic as a Buccal Disinfectant, 214.
Acid Salicylic Dressings, Assay of, 230.
Acid Tartaric, Detection and Determination of Pb. in (Gadais), 103.
Acid Thorium Urate, 440.
Acids, Fatty, of Castor Oil, 478.
Acokanthera abyssinica in German East Africa, 202.
Aconite Root and Preparations, U.S.P. Standards for, 397.
Aconitine, New Reaction for, 15.
Aconitum napellus, Cultivation of, 305.
Acorus calamus Root in India (D. Hooper), 172.
Adam, P.: Petroleum Products, 279.
Adrenaline Ointment, 227.
Adrenaline, Therapeutics of, 172.

Adulterant of Pepper (Erviop), 186.
Adulterated Civet, 60.
Adulterated Cream of Tartar (Millard), 70.
Adulterated East Indian Sandal Oil, 153.
Adulterated Eucalyptus Oil (Bennett), 73.
Adulterated French Lavender Oil, 103.
Adulterated Lemon Grass Oil, 106.
Adulterated Lycopodium, 201.
Adulterated Turpentine Oil, Detection of Petroleum and Pine-tar Oil in, 165.
Adulterated Vanillin, 165.
Adulteration of Alimentary Substances with Powdered Almond Shell, 316.
Adulteration of Antipyrine with Pyramidon, 135.
Adulteration of Beeswax Detected by Examining Colouring Matter, 45.
Adulteration of Cananga Oil with Coconut Oil and Resin, 55.
Adulteration of Lavender Oil with Ethyl Succinate and Spanish Lavender Oil, 102.
Aerva javanica in Burma, 179.
Ahmed-Hussein: Detection of Sodium Silicate in Soap, 154.
Ahrens, C., and P. Hott: Tests for Storax, 157.
Airol as a Diagnostic in Carious Aural Inflammation, 173.
Alboni, —: Active Principles of *Cecropia peltata*, 58.
Albumin in Urine, Detection and Determination of (Bollocq), 15.
Alcock, F. H.: Ash of Myrrh, 422.
Alcock, F. H.: Compound Tincture of Gentian, 423.
Alcock, F. H.: Modified Umbelliferone Test, 165.
Alcock, F. H.: Volumetric Determination of $BaCl_2$, 45.
Alcohols, Colour Reactions for (Guérin), 16.
Alcohols, Primary, Secondary and Tertiary, New Method of Distinguishing (Sabatier and Senderens), 17.
Aldehydes and Ketones, Determination of, by Neutral Sulphite Method (Schimmels), 17.
Alkaline Antiseptic Solution, N.F., 227.
Alkaline Fluorides, Detection of, in Meat Foods, 17.
Alkaliverdin, Colouring Matter of *Sarracenia purpurea*, 18.
Alkaloid, Mydriatic, in *Lactuca muralis*, 101.
Alkaloid, New, from *Lupinus polyphyllus*, 109.
Alkaloidal Assay of Cinchona Bark (S. C. Gadd), 471.
Alkaloidal Assay of Belladonna Leaves (Forsberg), 46.
Alkaloidal Assay of Extract of Belladonna Leaf (Farr and Wright), 234.
Alkaloidal Assay of Liquid Extract of Cinchona (E. S. Hooper), 245.
Alkaloidal Assay of Nux Vomica Extract (Bourquelot), 272.
Alkaloids, Determination of, with Potassium Bismuth Iodide, 18.
Alkaloids, Mydriatic, Solanaceous, Occurrence of, in Different Plants, 115.
Alkaloids of *Corydalis cava* and *C. solida* Herb (Gadamer and Haars), 69.
Alkaloids of *Datura metel*, *D. arborea*, *D. quercifolia* and *D. stramonium* (E. Schmidt), 115.
Alkaloids of Lupins, 109.
Alkaloids of Opium, Criticism of B.P. Monographs on (Dott), 120.
Alkaloids of *Zygadernus venenosus*, 168.
Allanbekia stuhlmannii in German East Africa, 203.
Allyl and Propenyl Groups of Aromatic Compounds, Differentiation of, 24.
Almatenia, 174.
Almond Meal, 293.
Aloes, Aloinose, the Sugar of, 20.
Aloes, Compound Decoction of, Concentrated, 447.
Aloes, Detection and Differentiation of, in Compound Rhubarb Pills (Fausett), 227.
Aloes, Valuation of (Tschirch and Hoffbauer), 19.
Aloinose, Sugar of Aloes, 20.
Aloy, J., and A. Frebault: Preparation of Picramic Acid and Determination of K. with, 130.
a-Thujone, 162.
Althæa officinalis, Cultivation of, 307.
Altingia excelsa Balsam, 178.

Alvarez, E. P.: New Colour Reactions for Polyphenols, 133.
Alvarez, E. P.: New Reaction for Aconitine, 15.
Alvarez, E. P.: New Reagent for Potassium, 134.
Ammonia in Water, New Reaction for (Trillat and Turchet), 167; (Cavalier and Arthus), 168.
Ammonium Acetate and Cinchona Extract, Incompatibility of, 229.
Ammonium Acetate and Citrate, Behaviour of, with Cinchona Alkaloids (Lyons), 243.
Amomum mala Fruit, Essential Oil of, 21.
Amorpha fructuosa, Essential Oil of, 21.
Anæsthesine for Mouth Diseases, 174.
Anal Fissure, Compound Application of Ichthyol for, 257.
Analysis of Compound Tincture of Camphor (Bird), 459.
Anderson, W. C.: Formation of MgO from Magnesium Carbonate by Heat, and the Effect of Temperature on the Product, 109.
Anethol, Polymerization of, by Keeping, 22.
Angostura Copaiba (Schimmels), 69.
Aniline Colours and Salicylic Acid, Detection of, in Foods (La Wall), 22.
Aniline Colours, Toxicity of Certain, 293.
Animal Charcoal as an Antidote to Naphthols, 294.
Anthemis nobilis, Cultivation of, 310.
Antipest, a Domestic Insecticide, 294.
Antipyrine and Pyramidon, Separation of, 174.
Antipyrine, Determination of, with Picric Acid, 22.
Antiseptic Action of Kava-kava Resin, 200.
Antiseptic Solution, N.F., 229.
Antiseptic Vapour, 294.
Ants at Syrup Jars, To get rid of, 294.
Apiol, Dill-, and Parsley- (Thoms), 23.
Apomorphine Bromethylate, 190.
Appert, —, and Jaffé: Red Colour of Urine after Administration of Pyramidon, 211.
Application, Camphor, for Itching, 296.
Application for Perspiring Hands, 295.
Application for Warts, 295.
Apricot Tree Gum, French, 24.
Aquilaria agallocha, 178.
Arctium lappa, Essential Oil of, 24.
Argentine Mustard, 204.
Aristol, Adulterated, 24.
Arnicated Cream, 277.
Aromatic Compounds, Differentiation of Allyl and Propenyl Groups of, 24.
Arrow Poison of the Lukarets of the Lado Territory, 25.
Arsenic, Detection of (Bird), 36.
Arsenic, Detection of, in Official Drugs (Dunstan and Robinson), 25; (Mann), 38; (Naylor and Chappel), 38.
Arsenic, Determination of, in Minute Quantity (Cowley and Catford), 41.
Arsenic in H_2O_2 Solution, 42.
Arsenic in Reduced Iron, Detection and Limit for (C. A. Hill and J. C. Umney), 42.
Arsenic in Sodium Phosphate, 43.
Arsenic, New Method of Separation, 43.
Arsenious Iodide, Notes and Criticisms on (Cowley and Catford), 489.
Artemisia annua, Essential Oil of, 43.
Artemisia herba alba, Essential Oil of, 44.
Arthus, —, and — Cavalier: New Reaction for NH_3 in H_2O, 168.
Artificial Musk Solutions, 295.
Arundo donax in Burma, 179.
Aseptic Infusions (Currie), 258.
Ash of Calabar Bean (Kebler), 118.
Ash of Coca Leaves (Kebler), 118.
Ash of Digitalis Leaves (Kebler), 118.
Ash of Ipecacuanha (Kebler), 118.
Ash of Jaborandi (Kebler), 118.
Ash of Myrrh (Alcock), 422.
Ash of Nux Vomica (Kebler), 118.
Ash of Stramonium Leaves and Seeds (Kebler), 118.
Aspidium filix-mas, Cultivation of, 312.
Assay of Iodoform (Utz), 97.
Assay of Iodoform Dressing (Utz), 98.

Assay of Iodoform Gauze (Grimbert), 262.
Assay of Medicated Dressings (Kremel), 229.
Assay of *Rhamnus frangula* Bark (Warin), 144.
Assay of Rhubarb and Aloes (Tschirch and Cristofoletti), 145.
Asthma Cures, 295.
Asthma Fumigating Powders, 295.
Asthma Papers, 295.
Astruc, A.: Piperazine Glycerophosphates, 132.
Atoxyl, 174.
Atropa belladonna, Cultivation of, 311.
Atropa belladonna. *See* also under Belladonna.
Atropine Methyl Bromide, Therapeutics of, 175.
Aufrecht, —: Vasenol, 288.
Aufrecht, —: Vitose, 288.
Aya-Pana, True and False, 175.

B.

Backhousia citriodora, Essential Oil of, 44.
Bacteria in Plasters, 281.
Bahia Copaiba (Schimmels), 68.
Baker, R. T., and H. G. Smith: Constituents of Essential Oils of Eucalyptus of Various Species, 73.
Balland, —: Baobab Kernels, 44.
Balm of Columbia, 296.
Balmain's Phosphorescent Mass, 316.
Balsam, Gurjun, Collection of, in Cochin China, 195.
Balsam, Peruvian, in Ointments, 231.
Balsam, Peruvian, White, 128.
Baobab Kernels, Constitutents of, 44.
Barbados Lime Oil, 107.
Barbaloin, Constitution of (Jowett and Potter), 45.
Barbier, —, and A. Robin: Metallic Ferments and Colloidal Metals for Pneumonia, 203.
Bardet, —: Precautions in Compounding Orthoform, 275.
Barger, G.: Saponarin, 153.
Barillé, —: Incompatibility of Cherry Laurel Water with Alkaloidal Solutions, 243.
Barium Chloride, Volumetric Determination of, 45.
Bark Mixtures, Manipulation of, 231.
Baroni, F.: Hypodermic Injection of Iron, 256.
Baroni, F.: Test for Neutrality of Glass Bottles, 253.
Basic Bismuth Gallate Dressings, Assay of, 231.
Battandier, J. B.: Colour Reactions for Quinine and Quinidine, 136.
Batelle, F.: Toxicity of Red Blood Corpuscles of Various Animals on the Rabbit, 321.
Bay Berries, Bermudan, Essential Oil of, 47.
Bayne, S.: Carbolic Salve, 296.
Beebe, S. P., and B. H. Buxton: Formation of Fat from Albumin by Bacilli, 299.
Beeswax, Detection of Adulteration by Examination of Colouring matter, 45.
Beeswax, Indian (D. Hooper), 45.
Beeswax, Saponification Value of, 46.
Belladonna Leaf, Acetic Extract of (Dohme), 226.
Belladonna Leaf, Alkaloidal Assay of (Forsberg), 46.
Belladonna Leaf and Root, Powdered, Microscopical Characters of, 237.
Belladonna Leaf Extract, Alcoholic, Powdered, Standardized (Farr and Wright), 232.
Belladonna Leaf Extract, Formula of New *Codex* for, 231.
Belladonna Root, Exhaustion with Alcohol (E. Hooper), 235.
Belladonna Root, Powdered Alcoholic Extract of, Standardized (Farr and Wright), 236.
Belladonna, Standards for, in the U.S.P., 398.
Belladonna, Standardization of Preparations of (Naylor), 361.
Bellenoux, E. S.: Calcium Nitrate as Manure, 296.
Bellier, J.: Detection of other Oils in Nut Oil, 118.
Bellocq, H.: Detection and Determination of Albumin in Urine, 15.
Bennett, C. T.: Eucalyptus Oil Adulterated with Castor Oil, 73.
Bennett, C. T., and J. C. Umney: Essential Oil of *Eucalyptus polybracteata*, 80.

Bennett, C. T., and J. C. Umney: Essential Oils of the U.S.P., 404.
Bennett, C. T., and J. C. Umney: Sicilian Peppermint Oil, 126.
Bennett, C. T., and J. C. Umney: Suggested Characters and Tests for Cod Liver Oil, 64.
Bentin, —, and — Troeger: Essential Oil of *Pinus strobus*, 132.
Benzoin Lotion, 296.
Benzoinated Paraffin, 238.
Berberis aristata, *B. lycium* and *B. asiatica* as Sources of Rusot, 212.
Bergamot and other Citrus Oils (Burgess and Page), 47.
Bergell, —, and R. Pschorr: Euporphine, Apomorphine Bromethylate, 190.
Bergh, G. F.: New Alkaloid, from *Lupinus polyphyllus* Seeds, 109.
Berlinia eminii in German East Africa, 202.
Bermudan Bay Berries, Essential Oil of, 47.
Bertherand, —, and R. Gaultier: Magnesium Peroxide for Diarrhœa, 201.
Berti, E.: New Process for Determination of Aldehydes in Lemon Oil, 105.
Bertini, L.: Almatenia, 174.
Bertrand, G.: New Sugar in Mountain Ash Berries, 157.
Beryl, New Element in, 47.
Beslier, —: Sterilization of Catgut with Benzol, 241.
β-Eucaine Lactate, 176.
β-Naphthol as a Vermifuge, 176.
β-Thujone, 162.
Biltz, A., and H. Thoms: White Peruvian Balsam, 128.
Biochemical Standardization of Drugs, 387.
Birch Buds, Essential Oil of (Von Soden and Elze), 48.
Bird, F. C. J.: Analysis of Compound Tincture of Camphor, 459.
Bird, F. C. J.: Detection of Arsenic, 36.
Bischoff, —: Balsam of Peru in Ointments, 231.
Bismuth β-Resorcylate, 48.
Bismuth Gallate, Basic, Dressings, Assay of, 231.
Bismuth Meta-oxybenzoate, 48.
Bismuth Oxysalicylate, 49.
Bismuth Para-oxybenzoate, 48.
Bismuth Salts of Organic Acids, 48.
Bitter Almonds, Essential Oil of, Manipulation of the Cl Test, 49.
Bitter Orange Flowers, Formation of Essential Oil in, 49.
Bitter Orange Prevents Thalleioquin Reaction in Quinine Wine, 282.
Black Ink for Brass Stamps, 302.
Bleach for Nails, 313.
Blomberg, J. jun.: Quinine Pills, 282.
Blood Acid-Albumin Preparations, 238.
Boa, P.: Liniment of Potassium Iodide with Soap, 268.
Board of Agriculture, Order of, on Sheep Dips, 298.
Baus, —: Calcium Chloride for Bleeding Hæmorrhoids, 181.
Boissel, —: Frothing Powder to Facilitate taking Nauseous Medicines, 252.
Bondong, A.: Hirudin, 196.
Bone and Malt Mixture, 239.
Bonjean, C.: Arsenic in Sodium Phosphate, 43.
Borassus flabelliformis, Sugar of, 158.
Boric Acid, Detection of, with Tincture of Mimosa Flowers, 50.
Boric Acid Dressings, Assay of, 229.
Borneo Camphor, Collection of, by the Malays, 176.
Bornyl Valerianate as a Nervous Sedative, 178.
Bornyval, 178.
Botanical Source of Derbyshire Valerian, 220.
Bottles, Test for Neutrality of, 253.
Bougault, J.: Detection of Sodium Salts by Modified Fremy's Reagent, 155.
Bourcet, P.: Detection of Pyramidon as an Adulterant of Antipyrine, 135.
Bourquelot, E.: Nux Vomica Extract of the new *Codex*, 271.
Bourquelot, E.: Sugar of *Cocos nucifera* and of *Borassus flabelliformis*, 158.
Bourquelot, E., and H. Hérissey: General Presence of Trehalase in Fungi, 163.
Boyd, A.: Preparation of Camphor Liniment, 240.
B.P.C.: Appointment of Research Sub-Committee, 380.

B.P.C.: Attendance List at Brighton, **1905**, 354.
B.P.C.: Bell and Hills Fund, Financial Statement, 382.
B.P.C.: Bell and Hills Fund, Presentation of Books from, 499.
B.P.C.: Constitution, 328.
B.P.C.: Election of Officers, 501.
B.P.C.: Excursion to Arundel, 504.
B.P.C.: Financial Statement, 381.
B.P.C.: Foreign and Colonial Members, 329.
B.P.C.: General Business, 498.
B.P.C.: General Meeting, 356.
B.P.C.: Home Members, 332.
B.P.C.: Honorary Members, 329.
B.P.C.: Letters of Apologies for Absence, 376.
B.P.C.: List of Papers, 382.
B.P.C.: Nomination Form, 328.
B.P.C.: Obituary, 373.
B.P.C.: Officers, 351.
B.P.C.: Order of Business, **1905**, 352.
B.P.C.: Place of Meeting for **1906**, 500.
B.P.C.: Presidential Address, 358.
B.P.C.: Programme of Proceedings, **1905**, 351.
B.P.C.: Reception of Delegates, 377.
B.P.C.: Report of Executive Committee, 379.
B.P.C.: Research List, **1905**, 323–36.
B.P.C.: Rules, 329.
B.P.C.: Social Gatherings, 502.
B.P.C.: Thanks to Local (Brighton) Committee, 501.
B.P.C.: Transactions, 327-505.
B.P.C.: Visitor from the Cape, 384.
B.P.C.: Votes of Thanks, 502.
Brachin, A.: Lactase in the Vegetable Kingdom, 100.
Brandt, W., and C. Mannich: Substitution of *Heteropteris pauciflora* Root for Ipecacuanha, 197.
Brass Stamps, Black Ink for, 302.
Brassica alba and *B. nigra*, Cultivation of, 307.
Brassica, Various Species of, found in Mustard Seeds, 204.
Brauns, D. H.: Caper-rutin in *Capparis spinosa*, 55.
Brauns, D. H.: Quercitrin, 136.
Brauns, D. H.: Sophorin in *Sophora japonica*, 156.
Brieger, L., and M. Krause: Spear Poison from the Cameroons, 156.
Brietenstein, A.: *Equisetum arvense* as a Diuretic, 186.
Bromine Absorption Equivalent of Fats, New Method of Determining, 51.
Bromo-methyl-heptyl Ketone, 52.
Bruguiera gymnorhiza in German East Africa, 202.
Bruhat, J., and H. Dubois, Perborates, 127.
Brunel, L.: Thymomenthol, 163.
Bruni, G., and E. Tornani: Differentiation of Allyl and Propenyl Groups of Aromatic Compounds, 24.
Brunker, J. E.: Results obtained from the analyses of the analysts of the Poor-Law Union of Ireland in the year ending March 31, **1905**, 494.
Brunner, H.: Primula Camphor, 135.
Bryonia dioica, Cultivation of, 308.
Buddleia asiatica in Burma, 179.
Buffalo Milk, Lactose in, 53.
Buisson, —: Maple Sugar, 110.
Burgess, H. E., and T. H. Page: Bergamot and other Citrus Oils, 47.
Burmese Drugs (Hooper), 178.
Burmese Storax, 178.
Busse, W.: Medicinal Plants in German East Africa, 201.
Buxton, B. H., and S. P. Beebe: Formation of Fat from Albumin by Bacilli, 299.

C.

Cacao Butter, Behaviour of, with Certain Compounds, 239.
Cacao-butter Soap Dentifrices, 239.
Caffeine, Hypodermic Injection of, 240.
Cajuput Oil, Green Colour of (Prinsen-Geerling), 53.
Calabar Bean Preparations, Standardization of (Naylor), 367.
Calcium Chloride for Bleeding Hæmorrhoids, 181.
Calcium Nitrate as Manure, 296.
Calomelol, Ointment and Dusting Powder, 240.
Calophyllum inophyllum, Fixed Oil of Seeds of, 53.

Calumba, Concentrated Infusion of (Cripps), 442.
Calumba Root, so-called False (Holmes), 181.
Calycanthine (Gordin), 53.
Camphor Application for Itching, 296.
Camphor, Borneo, Collection of, 176.
Camphor, Compound Tincture, Analysis of, 459.
Camphor, Determination of, in Liniment of Camphor (Lothian), 55.
Camphor Liniment (Boyd), 240.
Camphor Milk, 241.
Camphor Snow, 241.
Cananga Oil Adulterated with Coconut Oil and Resin, 55.
Candle, Stramonium, 295.
Cantoni, H., and J. Chauterus: New Method of Separating Arsenic, 43.
Caper-rutin in *Capparis spinosa*, 55.
Capparis flavicans and *C. hastigera* in Burma, 179–180.
Capparis spinosa, Caper-rutin in, 55.
Capsicum Counter-irritant, 241.
Capsicum, Liquid Extract, 453.
Capsicum Ointment, 455.
Capsicum Ointment, Lanoline, 455.
Capsicum Paraffin Liniment, 241.
Capsicum, Pharmacy of (Gerrard), 451.
Capsicum Plaster, 456.
Capsicum Wool, 455.
Capsules, Ferrous Carbonate for, 472.
Capsules, Two Part, Gelatin, filling with Liquid, 252.
Caraway Oil, Constituents of, 55.
Carbolic Acid and Soft Soap Sheep Dip, 299.
Carbolic Acid Dressings, Assay of, 230.
Carbolic Acid in Hypodermic Injections, 181.
Carbolic Salve (Bayne), 296.
Cardamoms, Compound Tincture of (Lucas and Stevens), 247.
Carette, H.: Quinine Hydrochlorides, 138.
Carica papaya, Elixir of (Kirchgessner), 249.
Carnation Pink Sachet Powder, 318.
Carthamus tinctorius Fruit, Fixed Oil of, 56.
Cascara Sagrada, Chemical Examination of Bark (Jowett), 56.
Cascarilla, Infusion of, Concentrated (Cripps), 442.
Caspari, C. E.: Determination of Codeine in Opium, 65.
Castor Oil (Finnemore and Deane), 473.
Castor Oil, Suggested Official Characters and Tests for (Nash), 57.
Catechin and Acacatechin, 57.
Catford, J. P., and R. C. Cowley: Determination of Arsenic in Minute Quantity, 41.
Catford, J. P., and R. C. Cowley: Notes and Criticisms on Arsenious Iodide, 489.
Catgut, Sterilized (Grimbert), 284.
Catgut, Sterilization of, with Benzol, 241.
Cavalier, —, and — Arthus: New Reaction for NH_3 in H_2O, 168.
Cawnpore Rape, 204.
Cecropia peltata, Active Principles of, 58.
Cecropic Acid, 58.
Cecropidine, 58.
Cecropine, 58.
Cephalophine, 182.
Ceriops candolleana in German East Africa, 202.
Chap Salve, 297.
Chappel, E. J., and W. A. H. Naylor: Detection of Arsenic in Official Drugs, 38.
Charabot, E., and G. Laloue: Formation of Essential Oil in an Annual, 200.
Charabot, E., and G. Laloue: Formation of Essential Oil in Bitter Orange Flowers, 49.
Charta Sinapis (Gerrard), 242.
Chaulmoogra Liniment, 242.
Chaulmoogra Oil, Pharmacy of, 242.
Chaulmoogra Oil Spirit, 242.
Chaulmoogra Ointment, 242.
Chaulmoogra Plaster, 242.
Chauterus, J., and H. Cantoni: New Method of Separating Arsenic, 43.
Chemical Plant-food, 297.
Chemistry, 13–168.
Chemistry and Pharmacy of *Viola odorata* Leaves, 466.
Chenopodium album in Burma, 180.
Cherry Laurel-water and Alkaloidal Solutions, Incompatibility of, 243.

Chevallier, —, and — Pouchet: Physiological Action of Valerian Juice, 220.
Chithee, 179.
Chlopin, E. W.: Toxicity of Certain Aniline Colours, 293.
Chlorethoform, 182.
Chloroform as an Antidote to Nitrous Oxide Poisoning, 183.
Chloroform as a Tænifuge, 182.
Chochar, 213.
Choline, the Toxin of Epilepsy, 297.
Christofoletti, —: Determination of Oxymethyl-anthraquinone Constituents in Purgative Drugs, 123.
Christofoletti, —, and A. Tschirch: Rhubarb and Aloes, Assay of, 145.
Chromogenous Ethers in Lichens, Test for, 209.
Chrysarobin, Compound Ointment of (Dreuw), 243.
Cider Must, Preparation of, from Sterilized Apples, 297.
Cinchona, Acid Infusion of Concentrated (Cripps), 442.
Cinchona Alkaloids, Behaviour of, with Solutions of Ammonium Acetate and Citrate (Lyons), 243.
Cinchona Bark, Assay of (S. C. Gadd), 471.
Cinchona Bark, Determination of Quinine in (Vigneron), 137.
Cinchona Extracts, Incompatibility of, with Antipyretics, 244.
Cinchona, Liquid Extract of (E. S. Hooper), 244.
Cinchona Preparations, Standardization of (Naylor), 362.
Cinnamomum loureirii, Essential Oil of, 59.
Cinnamomum tamala in Burma, 179.
Cissampelos pareira in Burma, 180.
Citrate of Iron and Quinine in Mixtures, 245.
Citronella, Essential Oil of, Official Testing in Ceylon, 59.
Citroptene of Lemon Oil, 59.
Civet, Adulterated, 60.
Clausina anisata in German East Africa, 203.
Cleary's Asthma Fumigating Powder, 296.
Clément, E.: Formic Acid for Muscular Trembling, 193.
Cloetta, —: Digalene, Soluble Digitoxin, 184.
Cloves, Essential Oil of, Refractive Index of, 60.
Cobalt, New Reaction for (Pozzi-Escot), 61.
Coca, Standards for, in the U.S.P., 398.
Cocaine and Morphine, New Reactions of (Reichard), 61.
Cochlearia armoracia, Cultivation of, 307.
Cochlospermum gossypium, Gum of, 183.
Coconut Soap, Neutral, 283.
Cocos nucifera, Sugar of, 158.
Cod Liver Oil (Gane), (Liversege), 62.
Cod Liver Oil, Kremel's Reaction for (Schamelhout), 64.
Cod Liver Oil, Suggested Official Characters and Tests for (Umney and Bennett), 64; (Parry), 65.
Codeine, Determination of Opium in (Caspari), 65.
Coffea arabica var. *stuhlmannii*, *C. sanguebaricæ* and *C. schumannii* in German East Africa, 201.
Coignet, —: Enesol, 185.
Colchicum Corm, U.S.P. Standards for, 398.
Colchicum Seeds, Acetic Extract of (Dohme), 226.
Colcothars, Analysis of, 66.
Cold Cream (Hodges), 246.
Cold Cream, Petroleum, 277.
Cold-water Starch and Gloss, 304.
Cold Water Starch, Liquid, 304.
Collie, J. N.: Methyl Fluoride, 113.
Collin, E.: Erviop, a Pepper Adulterant, 186.
Collin, E.: Powdered Almond Shell as an Adulterant of Alimentary Substances, 316.
Collyrium, Oily, of Eserine, 251.
Colour Reactions for Alcohols (Guérin), 16.
Colour Reactions for Tungsten, 164.
Comanducci, E.: New Reaction for Formic Acid, 15.
Commercial Samples of Official Galenicals (H. W. and S. C. Gadd), 273.
Composition of Dentifrices as Affected by Recent Investigations in Dental Science, 385.
Compound Elixir of Pepsin, 276.
Compound Ichthyol Application for Anal Fissure, 257.

Compound Licorice Powder (J. Evans), 267.
Compound Mixture of Chloral and KBr (Jackmann), 246.
Compound Pill of Galbanum, 253.
Compound Tincture of Camphor, Analysis of (Bird), 459.
Compound Tincture of Cardamoms (Lucas and Stevens), 247.
Compound Tincture of Gentian (Alcock), 423.
Compounding Orthoform, Precautions in, 275.
Concentrated Infusions (H. Deane), 259; (G. E. Pearson), 261; (Cripps), 441.
Concentrated Iodo-Syrup for the Preparation of Iodotannic Syrup, 264.
Confection of Senna (Lenton), 247.
Conine and Nicotine, Distinctive Reactions of (Reichard), 67.
Conine, Sparteine and Nicotine, Tests for (Reichard), 116.
Conium Fruit, U.S.P. Standards for, 398.
Conium maculatum, Cultivation of, 368.
Conium maculatum, Essential Oil of, 67.
Conium Ointment (Lenton), 248.
Conium Preparations, Standardization of (Naylor), 368.
Constitution of Barbaloin (Jowett and Potter), 45.
Constitution of Dill- and Parsley-Apiol (Thoms), 23.
Convallaria, Therapeutics of, 183.
Conversion of Isopilocarpine into Pilocarpine (Jowett), 98.
Copaiba Balsam, Angostura (Schimmel's), 69.
Copaiba Balsam, Bahia (Schimmels), 68.
Copaiba Balsam, Pará (Schimmels), 68.
Copaiba Balsam, Surinam (van Itallie), 68.
Copaiba Balsams (Schimmels), 68.
Copaiba Mixtures, Manipulation of (Wyatt), 248.
Copper Citrate Rods for Ophthalmic Work, 248.
Copper Laundry Ink, 303.
Copper Sulphate for Purification of Water Supplies, 69.
Copying Ink, Green, 303.
Cormimbœuf, H.: Analysis of Colcothars, 66.
Cormimbœuf, H.: Detection of Traces of Fe in MnO_2, 110.
Corydalis cava and *C. solida* Herb, New Alkaloids from (Gadamer and Haars), 69.
Coryza, Formane for, 192.
Cosmetic Soap Paste, Petrolatum, 315.
Cotargite, 270.
Cotton. *See* Wool.
Cowley, R. C., and J. P. Catford: Arsenious Iodide, Notes and Criticisms, 489.
Cowley, R. C., and J. P. Catford: Determination of Arsenic in Minute Quantity, 41.
Crampton, C. A.: Detection of Palm Oil in Other Oils, 123.
Crayons, Copper Citrate, 248.
Crayons, Permanganate, 277
Cream, Arnicated, 277.
Cream of Tartar, Adulterated (Millard), 70.
Cream of Tartar, Detection and Determination of Pb. in (Gadais), 103.
Cream, Petroleum, 277.
Cream, Witch Hazel, 277.
Crême de Cacao for the Hair, 298.
Creosotal Pills, 248.
Creosote Wine, 249.
Cripps, R. A.: Commercial Concentrated Infusions, 441.
Cripps, R. A.: Concentrated Compound Decoction of Aloes, 447.
Croton oblongifolius in Burma, 180.
Crouzel, E.: Incompatibility of Ammonium Acetate and Extract of Cinchona, 229.
Crouzel, E.: Detection of $FeSO_4$ in $CuSO_4$, 70.
Cupric Sulphate, Detection of $FeSO_4$ in, 70.
Cuprocitrol Rods, 248.
Currie, A.: Aseptic Infusions, 258.
Cyanastrum sp. in German East Africa, 202.
Cypress, Essential Oil of, Constituents of, 70.
Cytisus scoparius, Cultivation of, 307.

D.

Dalché, —: Fluid Extract of *Senecio vulgaris* for Dyspepsia, 214.

Datura metel, D. arborea, D. quercifolia, and *D. stramonium,* Alkaloids of (E. Schmidt), 115.
Datura stramonium, Cultivation of, 311.
Datura stramonium, Indian, 97.
Deane, H.: Concentrated Infusions, 259.
Deane, H., and H. Finnemore: Castor Oil, 473.
Decoctum Aloes Co. Concentratum (Cripps), 447.
Delta Rays, 432.
Delphinium Seeds, Tincture of, (O'Neil), 249.
Denigès, G.: Incompatibility of Nirvanine and $HgCl_2$, 257.
Dental Caries, Formalin and Geranium Oil for, 300.
Dentifrice, Hydrogen Peroxide as, 302.
Dentifrice, Miller's Thymol, 320.
Dentifrices with Cacao-butter Soap, 239.
Derbyshire Valerian Root, 220.
Derris stuhlmannii in German East Africa, 202.
Detection of Saccharin in Beverages, 151.
Diacetyl-morphine Hydrochloride (Dott), 183.
Dialopsis africana in German East Africa, 202.
Diarrhœa, Tincture of Immature Oranges for, 215.
Diatoms, Pure Cultures of, 317.
Diazo-reaction of Typhoid, 298.
Dick, A. D., and E. W. Lucas: Official Tinctures, 288.
Digalene, Soluble Digitoxin, 184.
Digestive Power of Pepsin, Determination of (Lucas), 275.
Digitalis, Acetic Extract of (Dohme), 226.
Dill-Apiol, 23.
Dionine in Whooping Cough, 185.
Dioscorea bulbifera in Burma, 180.
Diphenyl Carbacide as a Reagent for Molybdenum, 71.
Dips for Sheep Scab, 298.
Di-sodic Orthophosphate as Basis for Permanganate Crayons, 277.
Dixon, W. E.: Bio-Chemical Standardization of Drugs, 387.
Dohme, A. R. S.: Acetic Extracts, 226.
Dolichos pseudo-pachyrrhizus in German East Africa, 202.
Dott, D. B.: Criticism of B.P. Monographs on Certain Opium Alkaloids, 120.
Dott, D. B.: Diacetyl-morphine Hydrochloride, 183.
Dott, D. B.: Ethylmorphine Hydrochloride, 186.
Dott, D. B.: Lithium Citrate, 108.
Dott, D. B.: Mercuric Zinc Cyanide, 486.
Dott, D. B.: Opium and Tincture of Opium, Morphinometric Assay of, 120.
Dregea rubicunda in German East Africa, 202.
Dressings, Medicated Assay of, 229.
Dressings, New, 270.
Dreuw: Compound Chrysarobin Ointment, 243.
Druce, G. C.: The Flora of Sussex, 426.
Drugs, Official, Detection of Arsenic in (Dunstan and Robinson), 25; (Bird), 36; (Naylor and Chappel), 38; (Mann), 38.
Dubois, H., and J. Bruhat: Perborates, 127.
Duncan, W.: Pill Excipient for Dried Ferrous Sulphate, 280.
Duncan, W.: Solubility of Quinine in Ammonia and Method of Testing Quinine Sulphate, 140.
Dunning, H. A. B., and N. G. Keirle: Toxicity of Saponin and its Employment as an Emulsifying Agent, 318.
Dunstan, W. R., and H. H. Robinson: Detection of Arsenic in Official Drugs, 25.
Dusting Powder, Calomelol, 240.
Dusting Powder, Xeroform, 288.
Dutch Mustard, 204.
Duyk, —: Pumice Powder as an Aid to Incineration, 97.
Dyspepsia, Fluid Extract of *Senecio vulgaris* for, 214.
Dysentery, Salol-coated Pills of Ipecacuanha for, 283.

E.

Eau de Beauté Cosmetic, 299.
Edelfsen, G.: Pepsin Mixture, 277.
Elder Flowers, Stearoptene of Essential Oil of, 71.
Elemis, Summary of Investigation of (Tschirch and Saal), 71–72.
Elephantopus scaber in Burma, 180.

Elixir of *Carica papaya* (Kirchgessner), 249.
Elixir of Gentian, Glycerinated, N.F., 253.
Elixir of Glycerophosphates, N.F., 255.
Elixir of Pepsin, Compound, 276.
Elze, F., and H. von Soden: Essential Oil of Birch Buds, 48.
Emery, J. A.: Determination of Nicotine in Presence of Pyridine, 117.
Emetine and Cephaeline Hydrochloride, Therapeutic Action of (Zopf), 185.
Emollient Skin Balm, 299.
Emodin, Determination of (Warin), 144; (Tschirch and Christofoletti), 145.
Emulsion, Petroleum (Nieco), 277; (N.F.), (McDonnell), (Cook), 278.
Emulsion of Petroleum with Hypophosphites, 278.
Endermol, 249.
Enesol, Mercury Salicylarsenate, 185.
Engels, O.: Bornyl Valerianate as a Nervous Sedative, 178.
English Mustard, 204.
English Rosemary Oil, 150.
Enklaar, C. J., and P. von Romburgh: Essential Oil of *Ocimum basilicum*, 119.
Epilepsy, Choline the Toxin of, 297.
Equisetum arvense as a Diuretic, 186.
Erba, C.: Quinine Hydrochlorides, 139.
Ergot, Acid Tincture of, 250.
Ergot, Extract of Formula for, in New *Codex*, 250.
Ergot, Liquid Extract of, of New Codex (Grimbert), 250.
Erlich's Reaction for Typhoid, 298.
Erviop, a Pepper Adulterant, 186.
Erythroplœum guiniense in German East Africa, 202.
Eserinol, Oily Collyrium of Eserine, 251.
Essence of Pepsin (Hynson), 277.
Essential Oil, Formation and Distribution of, in an Annual, 300.
Essential Oil of *Amomum mala* Fruit, 21.
Essential Oil of *Amorpha fructuosa*, 21.
Essential Oil of *Arctium lappa*, 24.
Essential Oil of *Artemisia annua*, 43.
Essential Oil of *Artemisia herba alba*, 44.
Essential Oil of *Backhousia citriodora*, 44.
Essential Oil of Bermudan Bay Berries, 47.
Essential Oil of *Betula lenta*, U.S.P. Characters for, 409.
Essential Oil of Birch Buds (Von Soden and Elze), 48.
Essential Oil of Bitter Almonds, Manipulation of the Test for Cl. in, 49.
Essential Oil of Bitter Almonds, U.S.P. Characters for, 408.
Essential Oil of Bitter Orange Flowers, Formation of, 49.
Essential Oil of Cajuput, Green Colour of (Prinsen Geerling), 53.
Essential Oil of Cajuput, U.S.P. Characters for, 409.
Essential Oil of Cananga, Adulterated with Coconut Oil and Resin, 55.
Essential Oil of Caraway, Constituents of, 55.
Essential Oil of Caraway, U.S.P Characters for, 410.
Essential Oil of *Cinnamomum loureirii*, 59.
Essential Oil of Citronella, Official Testing of, in Ceylon, 59.
Essential Oil of Cloves, Refractive Index of, 60.
Essential Oil of Cloves, U.S.P. Characters for, 410.
Essential Oil of *Conium maculatum*, Fruits and Herb, 67.
Essential Oil of Copaiba (Schimmels), 69.
Essential Oil of Copaiba, U.S.P. Characters for, 411.
Essential Oil of Coriander, U.S.P. Characters for, 411.
Essential Oil of Cubebs, U.S.P. Characters for, 412.
Essential Oil of Cypress, Constituents for, 70.
Essential Oil of Elder Flowers, Stearoptene of, 71.
Essential Oil of Erigeron, U.S.P., 412.
Essential Oil of Eucalyptus, Adulterated with Castor Oil, 73.
Essential Oil of Eucalyptus, Therapeutics of (E. M. Holmes), 187.
Essential Oil of Eucalyptus, U.S.P. Characters for, 412.

Essential Oil of *Eucalyptus polybracteata* (J. C. Umney and C. T. Bennett), 80.

Essential Oil of Fennel, U.S.P. Characters for, 412.

Essential Oil of *Fagara octandra*, 80.

Essential Oil of French Camphor Leaves, 102.

Essential Oil of Geranium and Formalin for Dental Caries, 300.

Essential Oil of *Hedeoma*, U.S.P. Characters for, 413.

Essential Oil of *Inula graveolens*, 97.

Essential Oil of Juniper Berries, Russian, 100.

Essential Oil of Juniper, U.S.P. Characters for, 413.

Essential Oil of Lavender, French, Adulterated, 103.

Essential Oil of Lavender Flowers, U.S.P. Characters for, 413.

Essential Oil of *Ledum palustre*, Stearoptene of, 104.

Essential Oil of Lemon, Citroptene of, 59.

Essential Oil of Lemon, New Process for Aldehyde Determination (Berti), 105.

Essential Oil of Lemon Petit-grain, 106.

Essential Oil of Lemon, U.S.P. Characters for, 414.

Essential Oil of Lemongrass, Adulterated with Citronella Oil, 106.

Essential Oil of Lignaloe, Characters of, 107.

Essential Oil of Limes, Barbados, 107.

Essential Oil of Matico (Thoms), 110.

Essential Oil of *Monarda didyma*, 115.

Essential Oil of Mustard, Determination of, in Commercial Mustard Seeds, 205.

Essential Oil of Mustard, U.S.P. Characters for, 418.

Essential Oil of Nikkei, 59.

Essential Oil of Nutmeg, B.P. Characters for, 119.

Essential Oil of Nutmeg, U.S.P. Characters for, 415.

Essential Oil of *Ocimum basilicum*, 119.

Essential Oil of Opoponax, 121.

Essential Oil of Orange, U.S.P. Characters for, 409.

Essential Oil of Patchouli, Constituents of, 125.

Essential Oil of Peppermint, French, 125.

Essential Oil of Peppermint, Javan, 125.

Essential Oil of Peppermint, Sicilian, 126.

Essential Oil of Peppermint, U.S.P. Characters for, 414.

Essential Oil of *Phellandrium aquaticum*, 128.

Essential Oil of Pine Tar, Finnish, 131.

Essential Oil of Pimento, U.S.P. Characters for, 415.

Essential Oil of *Pinus strobus*, 132.

Essential Oil of *Pinus sylvestris* Buds, 131.

Essential Oil of *Pseudotsuga mucronata*, 122.

Essential Oil of Raspberry, 144.

Essential Oil of Rose, Characters of (Schimmels), 147; (Jeancard and Satie), 148; (Simmons), 149.

Essential Oil of Rose, French (Jeancard and Satie), 148.

Essential Oil of Rose, Iodine Absorption Value of (Simmons), 149.

Essential Oil of Rose, U.S.P. Characters for, 416.

Essential Oil of Rosemary, English and Spanish, 150.

Essential Oil of Sandal Wood, East Indian, in Capsules, Adulterated, 153.

Essential Oil of Sandal Wood, U.S.P. Characters for, 417.

Essential Oil of Sandarach Wood, 153.

Essential Oil of Sassafras, U.S.P. Characters for, 418.

Essential Oil of Savin (Ziegelmann), 153.

Essential Oil of Savin, U.S.P. Characters for, 417.

Essential Oil of *Tanacetum boreale*, 159.

Essential Oil of Tea-rose, 148.

Essential Oil of *Tetranthera polyantha* var. *citrata*, 159.

Essential Oil of Thyme, U.S.P. Characters for, 418.

Essential Oil of Turpentine, Detection of Adulteration in (MacCandless), 164.

Essential Oil of Turpentine, Greek, 165.

Essential Oil of Wintergreen, U.S.P. Characters for, 412.

Essential Oil, Proportion of, in Commercial Mustards, 205.

Essential Oils of Eucalyptus, Constituents of, of Various Species (Baker and Smith), 73.

Essential Oils of the U.S.P., 404.

Essential Oils, Toxicity of, in the Living Cell, 321.

Ethyl Succinate as Adulterant of Lavender Oil, 102.

Ethylmorphine Hydrochloride (Dott), 186.

Eucalyptus occidentalis Bark, 78.

Eucalyptus Oil Adulterated with Castor Oil (Bennett), 73.

Eucalyptus Oils, Constituents of, of Various Species (Baker and Smith), 73.

Eucalyptus Oils, Therapeutics of (E. M. Holmes), 187.

Eucalyptus polybracteata, Essential Oil of (J. C. Umney and Bennett), 80.

Euguform and Euguform Gauze and Wool, 271.

Euguform Paint, 251.

Eupatorium africanum in German East Africa, 203.

Euphorbia antiquorum in Burma, 180.

Euporphine, Apomorphine Bromethylate, 190.

Euquinine in Mixtures, 251.

Evans, J.: Compound Licorice Powder, 267.

Exodin (Merck), 190; (Zernik), 191.

Extract of Belladonna Leaf, Formula of New *Codex* for, 231.

Extract of Belladonna Leaf, Alcoholic, Powdered, Standardized (Farr and Wright), 232.

Extract of Belladonna Root, Powdered, Alcoholic (Farr and Wright), 236.

Extract of Capsicum, Liquid, 453.

Extract of Ergot of New *Codex*, 250.

Extract of Hyoscyamus of the New *Codex*, 256.

Extract of Maize Stigmata, 268.

Extract of Malt Soap, 305.

Extract of Nux Vomica of New *Codex*, 271.

Extract of Pariera, Liquid (Greenish), 275.

Extract of Taraxacum, Liquid (Lenton) 268.

F.

Fagara octandra, Essential Oil of, 80.

False Calumba Root, So-called, 181.

False Yohimbi Bark, 191.

Farr, E. H., and R. Wright: Powdered Alcoholic Extract of Belladonna Leaf, Standardized, 232.

Farr, E. H., and R. Wright: Powdered Alcoholic Extract of Belladonna Root, Standardized, 236.

Fat, Formation of, from Albumin by Bacilli, 299.

Fat of Seeds and Seed-Hairs of Nux Vomica; and of Preparations of Nux Vomica, 470.

Fats, New Method for Determining Bromine Absorption Value of, 51.

Fats, Rancid, Detection of, in Alimentary Substances, 143.

Fatty Acids of Castor Oil, 478.

Fawsett, T.: Detection and Differentiation of Aloes in Compound Rhubarb Pills, 227.

Fayolle, Villiers, Maynier de la Source and Rocques: Detection of Saccharin in Beverages, 151.

Fendler, G.: Examination of Commercial Lecithins, 104.

Fendler, G.: Fixed Oil of Seeds of *Calophyllum inophyllum*, 53.

Fendler, G.: Fixed Oil of *Carthamus tinctorius*, 56.

Fendler, G.: Fucol not an Efficient Substitute for Muscular Trembling, 193.

Feronia elephantum Gum, 191.

Ferric Chloride Dressings, Assay of, 229.

Ferric Vanadate; Ferrozon, 192.

Ferrous Carbonate for Capsules, 472.

Ferrous Chloride, Pill-excipient for, 280.

Ferrous Sulphate, Dried, Pill-Excipient for, 280.

Ferrozon, 192.

Fibrolysin, 192.

Filling Ointments into Collapsible Tubes, 274.

Filmaron, 192.

Finnemore, —, and — Wade: Chlorethoform, 182.

Finnemore, H., and H. Deane: Castor Oil, 473.

Finnish Pine Tar Oil, 131.
Fischer's Asthma Powder, 296.
Fish Oils, Characters of (Liverseege), 53.
Fixed Oil of Seeds of *Calophyllum inophyllum*, 53.
Fjellander, A. G.: Dionine in Whooping Cough, 185.
Flagellaria indica in German East Africa, 202.
Fleurent, E.: Determination of Phosphoric Acid in Food, 129.
Floor-Wax, 304.
Flora of Sussex, 426.
Fluid Extract of *Senecio vulgaris* for Dyspepsia, 214.
Fluorides, Alkaline, Detection of, in Meat Foods, 17.
Fœniculum capillaceum, Cultivation of, 308.
Foot Powder, 300.
Foreign Seeds in Mustard, 205.
Formalin and Geranium Oil for Dental Caries, 300.
Formalin Cotton, 252.
Formalin Gauze and other Formalin Dressings, 252.
Formane for Coryza, 192.
Formation and Distribution of Essential Oil in an Annual, 300.
Formation of Fat from Albumin by Bacilli, 299.
Formic Acid for Muscular Trembling, 193.
Formic Acid, New Reaction for, 15.
Formula for Inks, 302.
Forsberg, W. C.: Alkaloidal Assay of Belladonna Leaves, 46.
Frabot, C.: Colour Reactions for Tungsten, 164.
Frebault, A., and J. Aloy: Picramic Acid, New Process for Preparation of, and Determination of K. with, 130.
French Apricot-tree Gum, 24.
French Camphor Leaves, Essential Oil of, 102.
French Peppermint Oil, 125.
French Rose Oil (Jeancard and Satie), 148.
Fritz, G. and R.: Potassium Sulphoguaiacolate, 211.
Froidevaux, J. P.: Detection of Alkaline Fluorides in Meat Foods, 17.
Frothing Powder to facilitate taking of Nauseous Medicines, 252.
Fruit Vinegars, 301.
Fucol not an Efficient Substitute for Cod Liver Oil, 193.
Fulmer, E.: Reaction of Lard from Cotton Seed Meal-fed Hogs, with Halphen's Test, 102.
Fumigating Preparations, Asthma, 295.
Fungi, Trehalase in, 163.
Furniture Polish, Paraffin, 314.

G.

Gadais, L. and J.: Detection and Determination of Pb. in Cream of Tartar and Tartaric Acid, 103.
Gadamer, J., and O. Haars: New Alkaloids from *Corydalis cava* and *C. solida herb*, 69.
Gadd, H. W.: Chemistry and Pharmacy of the Leaves of *Viola odorata*, 466.
Gadd, H. W. and S. C.: Commercial Samples of Official Galenicals, 273.
Gadd, S. C.: Laboratory Notes on Nux Vomica Seeds; the Assay of Cinchona Bark, and the Manufacture of Ferrous Carbonate, 470.
Galbanum Pill, Compound (D. A. Young), 253.
Galenicals, Standardization of, 358.
Galimard, J.: Keratin in Eggs of Ringed Snake, 303.
Gane, E. H.: Cod Liver Oil, 62.
Gans, J., and L. Vanino: Phosphorescent Pastes and Masses, 316.
Garcinia livingstonei and *G. bussei* in German East Africa, 203.
Gardal Mustard, 204.
Gardenia turgida in Burma, 179.
Gardner, C. T. H.: Water Displacement in Preparation of Tinctures, 286.
Garsed, W.: Quinine Acid Hydrochloride, 419.
Gasertolobium bidens and *G. polystachum* from West Australia, 221.
Gaultier, R., and — Bertherand: Magnesium Peroxide for Diarrhœa, 201.
Gauze, Euguform, 271.
Gauze, Iodoform, Assay of (Grimbert), 262.
Gauze, Isoform, 271.
Gauze, Quinine Lygosinate, 271
Gauze, Stypticine, 270.

Gauzes, Medicated, Assay of, 229.
Gelatine Capsules, Two-part, Filling with Liquid, 252.
Gelatin Ovules (Grimbert), 253.
Gentian, Compound Infusion of, Concentrated (Cripps), 443.
Gentian, Compound Tincture of (Alcock), 423.
Gentian, Glycerin Elixir of, N.F., 253.
German Mustard, 204.
German Opium, 206.
Gerrard, A. W.: *Charta sinapis*, 242.
Gerrard, A. W.: Pharmacy of Capsicum, 451.
Gemayel, M.: Kola Granules, 265.
Gies, W. J., and G. M. Meyer, Alkaliverdin in *Sarracenia purpurea*, 18.
Glass Bottles, Test for Neutrality of, 253.
Gloriosa superba in Burma, 179.
Glycerin-Camphor Ice, 301.
Glycerin Jelly, 254.
Glycerin of Lead Acetate (Lothian), 254.
Glycerin Suppositories, Development of Red Colour in, 255.
Glycerinated Elixir of Gentian, N.F., 253.
Glycerophosphates, Elixir, N.F., 255.
Glycosal for Acute Rheumatism, 193.
Golden Seal, 193.
Gonococci, Stain for, 301.
Gordin, H. M.: Calycanthine, 53.
Gordon, F. T.: Ricin Soap, 282.
Granules, Kola, 265.
Greek Turpentine Oil, 165.
Green Copying Ink, 303.
Greenish, H. G.: *Linimentum Hydrargyri*, 268.
Greenish, H. G.: Liquid Extract of Pareira, 275.
Greenish, H. G.: *Pilula Ferri*, 281.
Greenish, H. G.: Suggested Improvements in Certain Official Syrups, 285.
Grimal, E.: Essential Oil of Sandarach Wood, 153.
Grimbert, J.: Podophyllin and Belladonna Pills, 281.
Grimbert, L.: Arsenic in H_2O_2 Solution, 42.
Grimbert, L.: Extract of Belladonna (Leaf), of New *Codex*, 231.
Grimbert, L: Extract of Ergot of New *Codex*, 250.
Grimbert, L.: Extract and Syrup of Maize Stigmata, 268.
Grimbert, L.: Extract of Hyoscyamus of the New *Codex*, 256.
Grimbert, L.: Gelatin Ovules, 253.
Grimbert, L.: Iodotannic Syrup, 263.
Grimbert, L.: Liquid Extract of Ergot of New *Codex*, 250.
Grimbert, L.: Saline Solution of Gelatin, 283.
Grimbert, L.: Sterilized Catgut, 284.
Griserin, 195.
Gruene, H.: Phosphorescent Zinc Sulphide, 129.
Guaiacum Lozenges for Tonsilitis, 256.
Guérin, G.: Colour Reactions for Alcohols, 16.
Guigues, P.: Thalleioquin Reaction Prevented by Bitter Orange in Quinine Wine, 282.
Gum of *Stereospermum euphorioides*, 215.
Gurjun Balsam, Collection of, in Cochin China, 195.
Guzerat Rape Seeds, 204.
Gynocardic Acid Pills, 242.

H.

Haars, O., and J. Gadamer: New Alkaloids from *Corydalis cava* and *C. solida* Herb, 69.
Hair Dyes, Paraphenylene Diamine in, 124.
Hair Preparations, Paraffin, 314.
Harlay, M.: Saccharose in Officinal Roots, Rhizomes and Bulbs, 152.
Haronga thaniculata in German East Africa, 202.
Hartwich, C., and A. Vuillemin: Commercial Mustard Seeds, 204.
Healing Salve, Universal, 322.
Heat Evolution by Radium, 434.
Heckel, E.: Origin of the Potato, 313.
Heliotrope Sachet Powder, 318.
Heliotropium indicum in Burmah, 180.
Helium and Neon, Amount of, in the Atmosphere, 21.
Hemm, F.: Improved Syrup of Calcium Lactophosphate, 285.

Henbane Preparations, Standardization of (Naylor), 368.
Henbane, *See* also Hyoscyamus
Hepatic Colic, Sodium Glycocholate for, 214.
Herb Vinegar, 301.
Hérissey, H., and E. Bourquelot : General Presence of Trehalase in Fungi, 163.
Herzog, J.: False Yohimbi Bark, 191
Heteropteris pauciflora substituted for Ipecacuanha, 197.
Hett, P., and C. Ahrens : Tests for Storax, 157.
Hibiscus sabdariffa, 195.
Hill, C. A., and J. C. Umney : Arsenic in Reduced Iron, 42.
Hills, J. S. : Physiological Action of *Linum catharticum*, 201.
Hills, J. S., and W. P. Wynne : Linin, 107.
Hippol, 196.
Hirudin, 196.
Hodges, M. D. : Cold Cream, 246.
Hoenigschmeid, — : Anæsthesine for Mouth Diseases, 174.
Hoffbauer, —, and A. Tschirch Valuation of Aloes, 19.
Holdermann, E. : Zinc Borate or Oxyborate, 168.
Holmes, E. M. : Cultivation of Medicinal Plants, 305.
Holmes, E. M. : Bark of *Eucalyptus occidentalis*, 78.
Holmes, E. M. : *Hibiscus sabdariffa*, 195.
Holmes, E. M. : Jaborandi Leaves of Commerce, 199.
Holmes, E. M. : Poisonous Plants from West Australia, 221.
Holmes, E. M. : So-called False Calumba Root, 181.
Holmes, E. M. : Therapeutics of Eucalyptus Oils, 187.
Hooper, D. : *Acorus calamus* Root in India, 172.
Hooper, D. : Burmese Drugs, 178.
Hooper, D : Constituents of *Melia azadirachta* Leaves, 111.
Hooper, D. : Indian Beeswax, 45.
Hooper, D. : Rusot, 212.
Hooper, D. : *Trombidium grandissimum*, 217.
Hooper, Elsie S. : Exhaustion of Belladonna Root with Alcohol, 235.
Hooper, Elsie S. : Liquid Extracts of Cinchona, 244.
Houda, J. : Skimmianine, 154.
Hydrastis, U.S.P. Standards for, 399.
Hydriodic Acid, Glycerol of (Kirchgessner), 256.
Hydrogen Peroxide as a Dentifrice, 302.
Hydrogen Peroxide Solution, Arsenic in, 42.
Hynson, H. P., Essence of Pepsin, 277.
Hynson, H. P. : Filling Two-part Gelatin Capsules with Liquid, 252.
Hyoscyamus Extract of the New *Codex*, 256.
Hyoscyamus muticus and *Datura stramonium*, Indian, 97.
Hyoscyamus niger, Cultivation of, 311.
Hyoscyamus, U.S.P., Standards for, 399.
Hypodermic Injection of Caffeine, 240.
Hypodermic Injection of Iron, 256.
Hypodermic Injection of Phenol, 181.
Hypophosphorous Acid in Dispensing, 257.

I.

Ice, Glycerin-Camphor, 301.
Ichthyol, Compound Application for Anal Fissure, 257.
Ichthyol for Scarlet Fever, 196.
Iconogene as a Reagent for Potassium, 134.
Incineration, Pumice Powder as an Aid to, 97.
Incompatibility of Ammonium Acetate with Cinchona Extract, 229.
Incompatibility of Cherry Laurel Water with Alkaloidal Solutions, 243.
Incompatibility of Cinchona Extracts with Antipyretics, 244.
Incompatibility of Nervanine and $HgCl_2$, 257.
Indestructible Ink, 302.
Indian *Acorus calamus*, 172.
Indian Beeswax, 45.
Indian Brown Rape Seed, 204.
Indian *Hyoscyamus muticus* and *Datura stramonium*, 97.
Indian Mustards, 204.
Indigofera garckeana in German East Africa, 202.

Indoform, 197.
Infusion of Calumba, Concentrated, (Cripps), 442.
Infusion of Cascarilla, Concentrated, (Cripps), 442.
Infusion of Cinchona, Acid, Concentrated (Cripps), 443.
Infusion of Gentian, Compound, Concentrated (Cripps), 443.
Infusion of Quassia, Concentrated (Cripps), 444.
Infusions, Aseptic (Currie), 258.
Infusions, Concentrated (H. Deane), 259; (G. E. Pearson), 261; (Cripps), 441.
Injection, Hypodermic, of Iron, 256.
Ink, Black, for Brass Stamps, 302.
Ink, Copper, Laundry, 303.
Ink, Copying, Green, 303.
Ink for Porcelain Jars, 303.
Ink for Typewriter Ribbons, 302.
Ink for Zinc Labels, 303.
Ink Formulæ, 302.
Ink, Indestructible, 302.
Ink Powder, 303.
Ink, Transfer, Lithographic, 305.
Insecticide, Domestic, 294.
Insoluble Powders in Mixtures (Wyatt), 262.
Introduction, 1-12.
Inula graveolens, Essential Oil of, 97.
Iodoeugenol Gauze and Wool, 271.
Iodoform, Determination of, 97.
Iodoform Dressings, Assay of, 229.
Iodoform Gauze, Assay of (Grimbert), 262.
Iodotannic Syrup (Grimbert), (Vigneron), 263; (Wyatt), (Martin), 264.
Iodotannic Syrup Phosphated, 280.
Iodotannic Wine, Phosphated, 280.
Iodoterpin, 271.
Iodo-Syrup for the Preparation of Iodotannic Syrup, 264.
Iothion, 197.
Ipecacuanha Preparations, Standardization of (Naylor), 363.
Ipecacuanha substituted by *Heteropteris pauciflora*, 197.
Ipecacuanha, U.S.P. Standards for, 399.
Ishizaka, —: Matrine from *Sophora angustifolia*, 111.
Isoform, 197.
Isoform Gauze, 271.
Isophysostigmine, 198.
Isopilocarpine, Conversion of, into Pilocarpine (Jowett), 98.
Isopral, 198.
Isopral Mixture, 265.
Iso safrol, Toxicity of, 303.
Itallie, L. van: Powdered Amber as an Adulterant of Lycopodium, 201.
Itallie, L. van: Surinam Copaiba Balsam, 68.

J.

Jaborandi Leaves of Commerce (E. M. Holmes), 199.
Jaborandi Preparations, Standardization of (Naylor), 369.
Jaborandi, U.S.P. Standards for, 400.
Jackman, W. F.: Compound Elixir of Pepsin, 276.
Jackman, W. F.: Compound Mixture of Chloral and Potassium Bromide, 246.
Jaffé, —, and — Appert: Red Coloration of Urine after Administration of Pyramidon, 211.
Jalap, U.S.P. Standards for, 400.
Japan Wax (Parry), 98.
Jaquet, —: Filmaron, 192.
Javan Peppermint Oil, 125.
Jeancard, P., and C. Satie, Essential Oil of Rose, French and Bulgarian, 148.
Jorissen, A.: Potassium Permanganate Pills, 281.
Jowett, H. A. D.: Bromo-methyl Heptyl Ketone, 52.
Jowett, H. A. D.: Chemical Examination of Cascara Bark, 56.
Jowett, H. A. D.: Conversion of Isopilocarpine into Pilocarpine, 98.
Jowett, H. A. D.: Substances having Analogous Constitution to Pilocarpine, 130.
Jowett, H. A. D., and C. E. Potter, Constitution of Barbaloin, 45.
Juglans regia, Saccharose in, 100.
Jumelle, H.: *Stereospermum euphorioides* Gum, 215.
Juniper Berries, Russian, Essential Oil of, 100.
Juniperus communis, Cultivation of, 312.
Juniperus sabina, Cultivation of, 312.

K.

Kalawbin, 179.

Kapithamapiscum, 191.
Katzenstein, M.: Compound Ichthyol Application for Anal Fissure, 257.
Kava-kava Resin, Antiseptic Action of, 200.
Kebler, L. F.: Nitrogen and Ash of Certain Drugs, 118.
Keirle, H. G., jun., and H. A. B. Dunning: Toxicity of Saponin and its Employment as an Emulsifying Agent, 318.
Keratin in Eggs of Ringed Snake, 303.
Keroclean, Non-inflammable Cleanser, 304.
Ketones and Aldehydes, Determination of, by Neutral Sulphite Method (Schimmels), 17.
Kirchgessner, W. C.: Elixir of *Carica papaya*, 249.
Kirchgessner, W. C.: Glycerol of Hydriodic Acid, 256.
Kneipp's Pills, 315.
Koepke, K.: Menthyl Valerianate for Sea Sickness, 203.
Kola Granules, 265.
Kopp, A.: Vasenol, 288.
Krause, M., and L. Brieger: Spear Poison from the Cameroons, 156.
Kremel, A.: Assay of Medicated Dressings, 229.
Kremel's Reaction for Cod Liver Oil (Schamelhout), 64.
Kromayer, —: Lenigallol Paste, 267.

L.

Laboratory Construction, Amateur, 479.
Lactase in the Vegetable Kingdom, 100.
Lactose in Buffalo Milk, 53.
Lactose, New Reaction for, 100.
Lactuca muralis, Occurrence and Distribution of Mydriatic Alkaloid in, 101.
Laigre —: Therapeutics of Convallaria, 183.
Laloue, G., and E. Charabot: Formation of an Essential Oil in an Annual, 300.
Laloue, G., and E. Charabot: Formation of Essential Oil in Bitter Orange Flowers, 49.
Lami, P.: Potassium Percarbonate as a Source of O and H_2O_2, 134.
Lanoline Ointment of Capsicum, 455.
Lard from Cotton Seed Meal-fed Hogs, Reaction of, with Halphen's Test, 102.
Laundry Blue, Liquid, 304.
Laundry Blue, Paste, 304.
Laundry Ink, Copper, 303.
Laundry Specialities, 304.
Laundry Starch-glaze Powder, 304.
Laundry Wax-polish, 304.
Laurus camphora Leaves, French, Essential Oil of, 102.
Lavender Oil Adulterated with Ethyl Succinate and Spanish Lavender Oil, 102.
Lavender Oil, French, Adulterated, 103.
La Wall, C. H.: Detection of Aniline Colours and Salicylic Acids in Foods, 22.
Leach, A. E.: Composition of Turmeric, 164.
Lead Acetate, Glycerin of (Lothian), 254.
Lead, Detection and Determination of, in Cream of Tartar and Tartaric Acid (Gadais), 103.
Lead Subacetate, Strong Solution of (Merson), 265.
Lebeau, P.: Physical Properties of Propane, 135.
Lecithins, Commercial Examination of (Fendler), 104.
Lecocq, E.: Dephenylcarbacide as a Reagent for Molybdenum, 71.
Ledum palustre, Stearoptene of Essential Oil of, 104.
Léger, E.: Aloinose the Sugar of Aloes, 20.
Léger, E.: Methyl-nataloemodin and Nataloemodin, 114.
Lemaire, P.: Detection of Adulteration of Beeswax by examining the Colouring Matter, 45.
Lemaire, P.: Determination of Antipyrine with Picric Acid, 22.
Lemaire, P.: Disodic Orthophosphate as a Basis for Permanganate Crayons, 277.
Lemaire, P.: Picric Acid for Chilblains, 316.
Lemeland, P.: *Cochlospermum gossypium* Gum, 183.
Lemeland, P.: *Feronia elephantum* Gum, 191.
Lemeland, P.: French Apricot-tree Gum, 24.
Lemon Oil, New Process of Aldehyde Determination (Berti),

Lemon Petit-grain Oil, 106.
Lemon Vinegar, 301.
Lemongrass Oil, Adulterated with Citronella Oil, 106.
Lenigallol Paste, 267.
Lenton, W. H.: Confection of Senna, 247.
Lenton, W. H.: Liquid Extract of Taraxacum, 268.
Lenz's Salt, 70.
Leredde, —: Acetic Acid for Skin Applications, 283.
Lesage, J.: Animal Charcoal as an Antidote to Naphthols, 294.
Leucena glauca in Burma, 180.
Library Paste, White, 322.
Lichens used in Preparing Orchil, 208.
Licorice Powder, Compound (J. Evans), 267.
Liebrecht, A.: Isoform, 197.
Lignaloe Oil, Characters of, 107.
Lime and Sulphur Sheep Dip, 298.
Lime Oil, Barbados, 107.
Limonia acidissima, 179.
Liniment of Camphor (Boyd), 240.
Liniment of Camphor, Determination of Camphor in (Lothian), 55.
Liniment of Chaulmoogra, 242.
Liniment of Potassium Iodide with Soap (Shuttleworth), 267; (Boa), 268.
Liniment, Paraffin, of Capsicum, 241.
Linimentum Hydrargyri (H. G. Greenish), 268.
Linin, 107.
Linoleum and Floor Wax, 304.
Lint, Stypticine, 270.
Linum catharticum, Physiological Action of, 201.
Lipol Lip Salve, 305.
Liquid Cold-water Starch, 304.
Liquid Extract of Cinchona (E. S. Hooper), 244.
Liquid Extract of Ergot of New *Codex*, 250.
Liquid Extract of Nux Vomica, Fat of, 471.
Liquid Extract of Pareira (H. G. Greenish), 275.
Liquid Extract of Taraxacum (Lenton), 268.
Liquid Extracts, Table of Analytical Results obtained by Irish Analysts, 497.
Liquid Laundry Blue, 304.
Liquid Metal Polish, 313.
Liquors, Table of Analytical Results obtained by Irish Analysts, 497.
Lithium Citrate (Dott), 108.
Lithographic Transfer Ink, 305.
Liverseege, J. F.: Cod Liver and other Fish Oils, 62.
Lobelia, Acetic Extract of (Dohme), 227.
Lomidse, —: Stearoptene of Oil of *Ledum palustre*, 104.
Lothian, J.: Determination of Camphor in Liniment of Camphor, 55.
Lothian, J.: Glycerin of Lead Acetate, 254.
Lotion, Benzoin, 296.
Lozenges, Guaiacum, for Tonsilitis, 256.
Lucas, E. W.: Determination of the Digestive Power of Pepsin, 275.
Lucas, E. W., and A. D. Dick: Tinctures, Official, 288.
Lucas, E. W., and H. B. Stevens: Compound Tincture of Cardamoms, 247.
Lundwik, E.: Essential Oil of Finnish Pine Tar, 131.
Lupeol in *Roucheria griffithiana* Bark, 150.
Lupin Alkaloids, 109.
Lupinus polyphyllus, New Alkaloid from, 109.
Lycium, 212.
Lycopodium, Powdered Amber as an Adulterant of, 201.
Lyons, A. B.: Behaviour of Cinchona Alkaloids with Solutions of Ammonium Acetate and Citrate, 243.

M.

Maben, T.: Standardization in the New U.S.P., 394.
MacCandless, —: Detection of Adulteration in Turpentine Oil, 164.
Magnesia, Formation of, from Magnesium Carbonate by Heat, and the Effect of Temperature on the Properties of the Product, 109.
Magnesium Peroxide for Diarrhœa, 201.
Magnesium Sulphate, Synonyms for, 320.
Magnier de la Source, Villiers, Rocques and Fayolle: Saccharin in Beverages, 151.

Maize Stigmata, Extract and Syrup of, 268.
Mallet Bark, 78.
Malt Extract Soap, 305.
Manganese Dioxide, Detection of Traces of Iron in, 110.
Mann, E. W.: Detection of Arsenic in Official Drugs, 38.
Mann, H.: Artificial Musk Solutions, 295.
Mannich, C., and W. Brandt: Substitution of *Heteropteris pauci flora* Root for Ipecacuanha, 197.
Mantelin, —: Application for Warts, 295.
Manure, Calcium Nitrate as, 296.
Maple Sugar, 110.
Marpmann, G.: Antiseptic Action of Kava-kava Resin, 200.
Martindale, W. H.: Further Notes on Radio-activity, 429.
Masson, V.: Manipulated Smyrna Opium, 206.
Materia Medica, 169–221.
Mathis, —: Hydrogen Peroxide as a Dentifrice, 302.
Mathis, —: Neutral Tooth Powders, 313.
Matico Oil (Thoms), 110.
Matricaria chamomilla, Cultivation of, 310.
Matrine, 111.
Meat, Detection of Alkaline Fluorides in, 17.
Medicinal Mite, *Trombidium grandissimum*, 217.
Medicinal Plants, Cultivation of (E. M. Holmes), 305.
Medicinal Plants of German East Africa, 201.
Melia azadirachta Leaves, Constituents of, 111.
Members, Foreign and Colonial, B.P.C., 329.
Members, Home, B.P.C., 332.
Members, Honorary, B.P.C., 329.
Mendel, F.: Hypodermic Injection of Caffeine, 240.
Menthyl Valerianate for Sea-sickness, 203.
Menyanthes trifoliata, Cultivation of, 311.
Mercuric Chloride Dressings, Assay of, 230.
Mercuric Nitrate Ointment (Snavely), 269.
Mercuric Oxide, Yellow, Ointment of (Schanz), 269.
Mercuric Zinc Cyanide, 486.
Mercury Cyanide as a Disinfectant, 269.
Mercury, Detection of, in Urine (Zenghelis), 111; (Sonnie-Moret), 112.
Mercury Liniment (H. G. Greenish), 268.
Mercury Salicylarsenate, 185.
Mesotan, Precautions in Prescribing and Dispensing, 203.
Metal Polish, Liquid, 313.
Metal Polishes, 313.
Metallic Ferments and Colloidal Metals for Pneumonia, 203.
Methyl Alcohol, Detection of, in Presence of Ethyl Alcohol, 113.
Methyl Fluoride, 113.
Methylheptenone in Palmarosa Oil, 124.
Methylnatalo-emodin and Nataloemodin (Léger), 114.
Meyer, G. M., and W. J. Gies: Alkaliverdin in *Sarracenia purpurea*, 18.
Microscopical Characters of Powdered Belladonna, Leaf and Root, 237.
Mignon, —: Adrenaline Ointment, 227.
Milk of Camphor, 241.
Millard, E. J.: Adulterated Cream of Tartar, 70.
Miller's Thymol Dentifrice, 320.
Mimosa Flower Tincture to Detect Boric Acid, 50.
Mirbelia racemosa from West Australia, 221.
Mixture, Isopral, 265.
Mixture of Chloral and KBr, Compound (Jackman), 246.
Mixture, Pepsin, 277.
Mixtures, Citrate of Iron and Quinine in, 245.
Mixtures, Copaiba, Manipulation of, 248.
Mixtures, Insoluble Powders in, 282.
Moissan, H.: New Synthesis of Oxalic Acid, 122.
Moller, J.: Atoxyl, 174.
Molybdenum, Diphenylcarbacide as a Reagent for, 71.
Monarda didyma, Essential Oil of, 115.
Montanari, C.: Red Colouring Matter of Tomato, 144.
Moore, G. T.: Purification of Water Supplies with $CuSO_4$, 69.

Morgan, G. T.: Thorium Salts for Medicinal Use, 160.
Morphine, Reactions of (Reichard), 61.
Morphinometric Assay of Opium (Petit), 121.
Morphinometric Assay of Opium and its Tincture (Dott), 120.
Mourelo's Phosphorescent Mass, 316.
Muavi, 202.
Mucilage of Acacia (Pinchbeck), 225.
Muscular Trembling, Formic Acid for, 192.
Musk, Artificial, Solution of, 295.
Mustard Seeds, Commercial, 204.
Mydriatic Solanaceous Alkaloids, Occurrence of, in Different Plants, 115.
Myrrh, Ash of (Alcock), 422.
Myrrh, Tincture of, Dispensing (Ruddiman), 270.

N.

Nail Bleach, 313.
Naphthols, Animal Charcoal as an Antidote to, 294.
Naphthol-Camphor a Dangerous Drug, 205.
Nasarow, M. S.: Ichthyol for Scarlet Fever, 196.
Nash, L. Myddleton: Suggested Characters and Tests for Castor Oil, 57.
Natalo-emodin (Léger), 114.
Naylor, W. A. H.: Standardization of Galenicals, 358.
Naylor, W. A. H., and E. J. Chappel: Detection of Arsenic in Official Drugs, 38.
Neon and Helium, Amount of, in the Atmosphere, 21.
Neumeyer's Asthma Powder, 296.
Neutral Tooth Powders, 313.
Neutrality of Bottles, Test for, 253.
New Dressings, 270.
New Element in Beryl, 47.
New Sugar in Mountain Ash Berries, 157.
New Tuberculin Koch, 219.
Nicolaicz, A.: Hippol, 196.
Nicotine and Conine, Distinctive Reactions of (Reichard), 67.
Nicotine, Conine and Sparteine, Tests to Differentiate (Reichard), 116.
Nicotine, Determination of, in Presence of Pyridine (Emery), 117.
Niece, F. E.: Capsicum Counter-irritant and Capsicum Paraffin Liniment, 241.
Niece, F. E.: Domestic Insecticide, 294.
Niece, F. E.: Glycerin Camphor Ice, 301.
Niece, F. E.: Non-inflammable Cleansing Fluid, 304.
Niece, F. E.: Paraffin and Walnut Hair Stimulant, 314.
Niece, F. E. · Paraffin Furniture Polish, 314.
Niece, F. E.: Paraffin Hair Preparations, 314.
Niece, F. E.: Paraffin Rouges, 315.
Niece, F. E.: Perfumed Paraffin Cakes, 315.
Niece, F. E.: Petrolatum Cosmetic Soap Paste, 315.
Niece, F. E.: Petroleum Cold Cream, 277.
Nim Leaves, Constituents of, 111.
Nirvanine and $HgCl_2$, Incompatibility of, 257.
Nitrogen Iodide (Silberrad), 118.
Nitrogen, Presence of, and Amount of Ash, in Certain Medicinal Plants (Kebler), 118.
Non-inflammable Cleansing Fluid, 304.
Notes and Formulæ, 291–322.
Nut Oil, Detection of Other Oils in, 118.
Nutmeg, Essential Oil of, B.P. Characters of, 119.
Nux Vomica Extract of the New *Codex*, 271.
Nux Vomica, Fat of Seeds and Seed-hairs, 470.
Nux Vomica Preparations, Standardization of (Naylor), 364.
Nux Vomica Seeds, Laboratory Notes on (S. C. Gadd), 470.

O.

Ocimum basilicum, Essential Oil of, 119.
Ocimum canum in Burma, 180.
Ocimum canum in German East Africa, 203.
Œnanthe crocata, Cultivation of, 309.
Official Galenicals, Commercial Samples of (H. W. and S. C. Gadd), 273.

Ogui, —: Isophysostigmine, 198.
Oil, Castor (Finnemore and Deane), 473.
Oil, Castor, Characters and Tests for (Nash), 57.
Oil, Chaulmoogra, Pharmacy of, 242.
Oil, Cod Liver (Gane), (Liverseege), 62.
Oil, Cod Liver, Suggested Official Characters and Tests for (Umney and Bennett), 64 ; (Parry), 65.
Oil, Essential. *See* Essential Oil.
Oil, Fatty, of *Podophyllum peltatum*, 132.
Oil, Nut, Detection of Other Oils in, 118.
Oil of *Carthamus tinctorius* Fruit, 56.
Oil, Palm, Detection of, in Other Oils, 123.
Oils, Fish, Characters of (Liverseege), 63.
Ointment, Adrenaline, 227.
Ointment, Calomelol, 240.
Ointment, Capsicum, 455.
Ointment, Capsicum, Lanoline, 455.
Ointment, Carbolic Acid (H. G. Greenish), 288.
Ointment, Chaulmoogra, 242.
Ointment, Compound, Chrysarobin (Dreuw), 243.
Ointment, Conium (Lenton), 248.
Ointment for Psoriasis (Unna-Dreuw's), 274.
Ointment, Mercuric Nitrate (Snaveley), 269.
Ointment, Peruvian Balsam, 231.
Ointment, Yellow Mercuric Oxide, 269.
Ointments in Collapsible Tubes, Method of Filling, 274.
Old Tuberculin (Koch), 218.
Oleoresin of *Abies amabilis*, 171.
O'Neil, H. M. : Tincture of Delphinium Seeds, 249.
Opium Alkaloids, Criticism of B.P. Monographs on (Dott), 120.
Opium and Tincture of Opium, Morphinometric Assay of (Dott), 120.
Opium, Determination of Codeine in (Caspari), 65.
Opium, German, 206.
Opium, Persian, 206.
Opium Preparations, Standardization of (Naylor), 365.
Opium, Smyrna, "Manipulated," 206.
Opium, Suggested Morphinometric Assay Process for (Petit), 121.
Opoponax Oil, 121.
Orange Vinegar, 301.
Orchil, 208.
Orcin, Tests for, in Lichens, 209.
Oregon Balsam (Rabak), 122.
Origin of the Potato, 313.
Orthoform, Precautions in Compounding of, 275.
Otto of Rose. *See* Essential Oil of Rose.
Ovules, Gelatin (Grimbert), 253.
Ovules, Tannin, 286.
Oxalic Acid, New Synthesis of, 122.
Oxymethyl-anthraquinone, Constituents in Purgative Drugs, Determination of (Christofoletti), 123.

P.

Page, T. H., and H. E. Burgess : Bergamot and Other Citrus Oils, 47.
Palm Oil, Detection of, in Other Oils, 123.
Palmarosa Oil, Methyl-heptenone in, 124.
Papain Elixir (Kirchgessner), 249.
Papaver somniferum, Cultivation of, 307.
Papaver rhœas, Cultivation of, 306.
Papers, Asthma, 295.
Pará Copaiba (Schimmels), 68.
Paraffin and Walnut Hair Stimulant, 314.
Paraffin, Benzoinated, 238.
Paraffin Cakes, Perfumed, 315.
Paraffin Furniture Polish, 314.
Paraffin Hair Preparations, 314.
Paraffin Rouges, 315.
Paraphenylenediamine in Hair Dyes, Detection of, 124.
Pareira, Liquid Extract of (H. G. Greenish), 275.
Parkia bussei in German East Africa, 202.
Parry, F. J. : Adulterated Civet, 60.
Parry, E. J. : Japan Wax, 98.
Parry, E. J. : Lemongrass Oil Adulterated with Citronella Oil, 108.
Parry, E. J. : Suggested Official Characters and Tests for Cod Liver Oil, 65.
Parsley Apiol, 23.
Passiflora incarnata as a Sedative, 210.
Paste Laundry Blue, 304.
Paste, Lenigallol, 267.

Paste, Library, White, 322.
Paste, White, for Polishing Metal, 313.
Pastes and Masses, Phosphorescent, 316.
Pastor Kneipp's Pills, 315.
Pastureau,—: Presence of Acetylmethylcarbinol in Commercial Vinegar, 166.
Patchouli Oil, Constituents of, 125.
Patein, —: Separation of Antipyrine and Pyramidon, 174.
Paul, B. H.: Test for Cinchonidine in Quinine Sulphate, 142.
Pavesi, V.: Essential Oil of *Amorpha fructuosa*, 21.
Pearson, G. E.: Concentrated Infusions, 261.
Pencils, Permanganate, 277.
Pencils, Zinc Chloride, 290.
Pepper Adulterant, Erviop, 186.
Peppermint Oil, French, 125.
Peppermint Oil, Javan, 125.
Peppermint Oil, Sicilian, 126.
Pepsin, Determination of Digestive Power of (Lucas), 275.
Pepsin Elixir, Compound, 276.
Pepsin, Essence of (Hynson), 277.
Pepsin Mixture, 277.
Perborates, 127.
Perfumed Paraffin Cakes, 315.
Perhydrol, 210.
Perkin, A. G.: Catechin and Acacatechin, 57.
Permanganate Crayons, Disodic Orthophosphate as Basis for, 277.
Perrier, G.: Preparation of Cider Must from Sterilized Apples, 297.
Persian Mustard, 205.
Persian Opium, 206.
Perspiring Hands, Application for, 295.
Peruvian Balsam, White, 128.
Pessaries, Tannin, 286.
Petit, A., and Albert Petit: Morphinometric Assay of Opium, 121.
Petrolatum Cosmetic Soap Paste, 315.
Petroleum Cold Cream, 277.
Petroleum Emulsion (Niece), 277; (N.F.), 278; (MacDonnell), (Cook), 278.
Petroleum Emulsion with Hypophosphites, 278.
Petroleum in Turpentine Oil, Detection of, 164.
Petroleum Products, Petroleum Ether, Vaseline Oil and Vaseline, 279.
Pharmacy, 223–290.
Pharmacy of Capsicum (Gerrard), 451.
Pharmacy of *Viola odorata* Leaves, 466.
Phellandrium aquaticum, Essential Oil of, 128.
Phisalix, C.: Action of Radium Emanations on Toad Venom, 320.
Phosphated Iodotannic Syrup and Wine, 280.
Phosphorescent Preparations and Masses, 316.
Phosphorescent Zinc Sulphide, 129.
Phosphoric Acid, Determination of, in Foods (Fleurent), 129.
Physostigma, U.S.P. Standards for, 400.
Picramic Acid, New Process of Preparation of, and Determination of K. with, 130.
Picric Acid for Chilblains, 316.
Pill Excipient for Dried Ferrous Sulphate, 280.
Pill Excipient for Ferrous Chloride and Potassium Permanganate, 280.
Pills, Belladonna and Podophyllin, *Codex*, 281.
Pills, Compound Rhubarb, Detection and Differentiation of Aloes in, 227.
Pills, Creosotal, 248.
Pills, Gynocardic Acid, 242.
Pills, Ipecacuanha, Salol-coated, 283.
Pills, Potassium Permanganate (Joussen), 281.
Pills Pastor Kneipp's, 315.
Pills, Quinine (Blomberg), 282.
Pilocarpine, Substances having Analogous Constitution to (Jowett), 130.
Pilula Ferri (H. G. Greenish), 281.
Pinchbeck, G.: Acacia Mucilage, 225.
Pine-tar Oil, Finnish, 131.
Pine-tar Oil in Turpentine Oil, Detection of, 164.
Pinus halapensis, Essential Oil of, 165.
Pinus silvestris, Buds, Essential Oil of, 131.
Pinus strobus, Essential Oil of, 132.
Piperazine Glycerophosphates, 132.
Planès, P.: True and False Aya-Pana, 175.
Plant-food, Chemical, 297.

Plaster, Capsicum, 456.
Plaster, Chaulmoogra, 242.
Plasters, Bacteria in, 281.
Plectronia heliotropiodora in German East Africa, 203.
Plenderleith, J. W.: Pill Excipient for Ferrous Chloride and Potassium Permanganate, 280.
Plenderleith, J. W.: Filling Ointments into Collapsible Tubes, 274.
Pneumonia Metallic Ferments and Colloidal Metals for, 203.
Podophyllin and Belladonna Pills, *Codex*, 281.
Podophyllum peltatum, Fatty Oil of, 132.
Poisonous Plants, West Australian (E. M. Holmes), 221.
Polish, Furniture, Paraffin, 314.
Polish, Liquid, for Metal, 313.
Polish, Wax-, Laundry, 304.
Polishes for Metal, 313.
Pollard, E. W.: Amateur Laboratory Construction, 479.
Pollok, J. H.: New Element in Beryl, 47.
Polygonum tomentosum in Burma, 180.
Polymerization of Anethol by Keeping, 22.
Polyphenols, New Colour Reaction for (Alvarez), 133.
Porcelain Jars, Ink for, 303.
Porcher, C.: Lactose in Buffalo Milk, 53.
Potassium Bismuth Iodide for Determination of Alkaloids, 18.
Potassium Iodide and Soap Liniment (Shuttleworth), 267; (Boa), 268.
Potassium, New Reagent for (Alvarez), 134.
Potassium Percarbonate as a Source of O and H_2O_2, 134.
Potassium Permanganate Pencils, 277
Potassium Permanganate, Pill-excipient for, 280.
Potassium Permanganate Pills (Jorissen), 281.
Potassium Sulphoguaiacolate, 211.
Potato, Origin of, 313.
Potter, C. E., and H. A. D. Jowett: Constitution of Barbaloin, 45.
Pouchet, —, and — Chevallier: Physiological Action of Valerian Juice, 220.
Powder, Compound Licorice (J. Evans), 267.
Powder, Foot, 300.
Powder, Ink, 303.
Powders, Asthma, Fumigating, 295.
Powdered Almond Shell as an Adulterant of Alimentary Substances, 316.
Pozzi-Escot, E.: New Reaction for Cobalt, 61.
Premna latifolia in Burma, 180.
Presidential Address, 358.
Primary, Secondary and Tertiary Alcohols, New Method of Distinguishing (Sabatier and Senderens), 17.
Primula Camphor (Brunner), 135.
Prinsen-Geerling, H. C.: Green Colour of Cajuput Oil, 53.
Propane, Physical Properties of, 135.
Prunus lauro-cerasus, Cultivation of, 308.
Pschorr, R., and — Bergell: Euporphine, Apomorphine Bromethylate, 190.
Pseudotsuga mucronata, Essential Oil of, 122
Psoriasis, Drouw's Compound Chrysarobin Ointment for, 243.
Pterocarpus bussei in German East Africa, 202.
Pumice Powder as an Aid to Incineration, 97.
Pure Cultures of Diatoms, 317.
Pyramidon, Detection of, in Antipyrine, 135.
Pyramidon, Nature of Red Colour of Urine after Administration of, 211.

Q.

Quassia, Infusion of, Concentrated (Cripps), 444.
Quercitrin, 136.
Quinine Acid Hydrochloride (Garsed), 419.
Quinine and Cinchonidine, New Reactions for (Reichard), 136.
Quinine and Quinidine, Colour Reactions for (Battandier), 136.
Quinine, Determination of, in Cinchona Barks (Vigneron), 137.
Quinine Hydrochlorides (Carette), 138; (Erba), 139.
Quinine Lygosinate and Quinine Lygosinate Gauze and Wool, 271.
Quinine Pills (Blomberg), 282.

Quinine, Solubility of, in Ammonia, and Method of Testing Quinine Sulphate (Duncan), 140.
Quinine Sulphate Test for Cinchonidine in (Paul), 142.

R.

Rabak, F.: Essential Oil of *Pseudotsuga mucronata*, 122.
Rabak, F.: Oleoresin of *Abies amabilis*, 171.
Rabak, F.: Oregon Balsam from *Abies amabilis*, 122.
Radio-activity, 429.
Radium Electroscope, New, 433.
Radium Emanation, 434.
Ramsay, W.: Amount of Neon and Helium in the Atmosphere, 21.
Rancid Fats, Detection of, in Alimentary Substances, 143.
Rape Seeds, Various, 204.
Raspberry, Essential Oil of, 144.
Raspberry Shrub, 317.
Raspberry Vinegar, 301.
Reactions, Colour, for Quinine and Quinidine (Battandier), 136.
Reaction for Aconitine (Alvarez), 15.
Reaction for Cobalt (Pozzi-Escot), 61.
Reaction for Formic Acid (Commanducci), 15.
Reactions for Cocaine and Morphine (Reichard), 61.
Reactions for Polyphenols (Alvarez), 133.
Reactions for Quinine and Cinchonidine (Reichard), 136.
Read, S.: Composition of Dentifrices as affected by Recent Investigations in Dental Science, 385.
Reagent, New, for Potassium (Alvarez), 134.
Red Colour in Glycerin Suppositories, 255.
Red Colour of Tomato, 144.
Reduced Iron, Arsenic in (Dunstan and Robinson), 35; (Mann), 38; (C. A. Hill and J. C. Umney), 42.
Reichard, C.: Distinctive Reactions of Conine and Nicotine, 67.
Reichard, C.: New Reactions of Cocaine and Morphine, 61.
Reichard, C.: New Reactions for Quinine and Cinchonidine, 136.
Reichard, C.: Tests to Differentiate Nicotine, Conine and Sparteine, 116.
Research List, 1905, 323–326.
Results of Analyses of Pharmaceutical Preparations by the Analysts of the Poor Law Unions of Ireland in the Year ending March, 1905, 494.
Rhamnus frangula Bark, Determination of Active Principles in, 144.
Rheumatism, Acute, Glycosal for, 193.
Rhizophora mucronata in German East Africa, 202.
Rhubarb and Aloes, Assay of (Tschirch and Christofoletti), 145.
Rhubarb and the Plants Producing it (Tschirch), 211.
Rhubarb Pills, Detection and Differentiation of Aloes in (Fawsett), 227.
Richaud, A.: Mercury Cyanide as a Disinfectant, 269.
Richet, C.: Thalassine in Prawns, 159.
Richter, O.: Pure Cultures of Diatoms, 317.
Ricin, 474.
Ricin Soap, 282.
Ricinine, 473.
Ricinoleic Acid, 475.
Ringed Snake, Keratin in Eggs of, 303.
Rings, to Remove from Swollen Finger, 321.
Robert, —: Incompatibility of Cinchona Extracts with Antipyretics, 244.
Roberts, W.: Salve-coated Pills of Ipecacuanha for Dysentery, 283.
Robin, A., and — Barbier: Metallic Ferments and Colloidal Metals for Pneumonia, 203.
Robin, L.: Detection of Boric Acid with Tincture of Mimosa Flowers, 50.
Robinia pseudo-acacia, Robinin from, 147.
Robinin, 147.
Robinson, H. H., and W. R. Dunstan: Detection of Arsenic in Official Drugs, 25.
Rochard, E.: Danger of Use of Naphthol-Camphor, 205.
Rocques, Fayolle, Villiers, and Maynier de la Source: Detection of Saccharin in Beverages, 151.
Rods of Copper Citrate, 248.

Romburgh, P. von, and C. J. Enklaar: Essential Oil of *Ocimum basilicum*, 119.
Ronceray, P. S.: Orchil, 208.
Rosa canina, Cultivation of, 308.
Rosa involucrata in Burma, 180.
Rose Oil, Bulgarian Characters of (Schimmels), 147; (Jeancard and Satie), 148; (Simmons), 149.
Rose Oil, French (Jeancard and Satie), 148.
Rose Oil, Iodine Absorption Value of (Simmons), 149.
Rosemary Oil, English, 150.
Rosemary Oil, Spanish, 150.
Rosenthaler, L.: Vanillin and HCl as a Reagent, 165.
Roucheria griffithiana Bark, Lupeol from, 150.
Rouges, Paraffin, 315.
Rubber Gloves, Substitute for, 319.
Ruddiman, E. A.: Behaviour of Cacao Butter with Certain Compounds, 239.
Ruddiman, E. A.: Dispensing Tincture of Myrrh, 270.
Ruddiman, E. A.: Zinc Chloride and Iodide Solutions, 290.
Rusot, 212.
Russian Juniper Oil, 100.
Russian Mustard, 204.
Ruta graveolens, Cultivation of, 307.

S.

Saal, O., and A. Tschirch: Summary of Investigation of Elemi, 71.
Saal, O., and A. Tschirch: Tacamahaca Elemi, 158.
Saal, O., and A. Tschirch: Tacamahac Resin, 158.
Sabatier, P., and J. B. Senderens: New Method for Distinguishing Primary, Secondary and Tertiary Alcohols, 17.
Saccharin, Detection of, in Beverages (Villiers, Maynier de la Source, Rocques and Fayolle), 151.
Saccharose in *Juglans regia*, 100.
Saccharose in Officinal Rhizomes, Roots and Bulbs, 152.
Sachet Powders, 317.
Sack, J.: Tyrosine in Elderberries, 153.
Sack, J., and B. Tollens: Lupeol in Bark of *Roucheria griffithiana*, 150.
Sada Rape Seed, 204.
Sadtler, S. P.: Detection of Methyl Alcohol in Liquids Containing Ethyl Alcohol, 113.
Salicylic Acid as a Buccal Disinfectant, 214.
Salicylic Acid, Detection of (La Wall), 22.
Salicylic Acid Dressings, Assay of, 230.
Saline Solution of Gelatin, 283.
Salol-coated Pills of Ipecacuanha, 283.
Salve, Carbolic, 296.
Salve, for Chaps, 297.
Salve, Lip, 305.
Salve, Universal Healing, 322.
Salvoni, —: Saccharose in *Juglans regia*, 100.
Sambucus nigra Berries, Tyrosine in, 153.
Sambucus nigra, Cultivation of, 309.
Sandal Oil, East Indian, in Capsules, Adulterated with Castor Oil and West Indian Sandal Oil, 153.
Sandarach Wood, Essential Oil of, 153.
Sapin, A.: Arrow Poison of the Lukarets of the Lado Territory, 25.
Saponarin (Barger), 153.
Saponification Value of Beeswax, 46.
Saponin, Toxicity of, and its Employment as an Emulsifying Agent, 318.
Sapophthalum, Neutral Coconut Soap, 283.
Sarason, —: Malt Extract Soap, 305.
Sarepta Mustard, 204.
Sarracenia purpurea, Alkaliverdin in, 18.
Satie, C., and P. Jeancard: Essential Oil of Rose, French and Bulgarian, 148.
Savin, Essential Oil of, 153.
Scarlet Fever, Ichthyol for, 196.
Schamelhout, —: Kremel's Reaction for Cod Liver Oil, 64.
Schanz, F.: Yellow Mercuric Oxide Ointment, 269.
Schiffmann's Asthma Powder, 296.

Schmidt, E.: Citroptene, the Stearoptene of Essential Oil of Lemon, 59.
Schmidt, E.: Occurrence of Mydriatic Solanaceous Alkaloids in Different Plants, 115.
Schimmels: Determination of Aldehydes and Ketones by Neutral Sulphite Method, 17.
Schindelmeiser, J.: Persian Opium, 206.
Schober, C.: Glycosal for Acute Rheumatism, 193.
Schwartz, —: Detection of $KHC_4 H_4O_6$ in $SbKC_4H_4O_7$, 159.
Schwarz, —: Saponification Value of Beeswax, 46.
Scopola, U.S.P. Standards for, 400.
Scoville, W. S.: Spermaceti instead of Beeswax for Hardening Suppositories, 284.
Sea-sickness, Menthyl Valerianate for, 203.
Sea-sickness, Validol for, 221.
Seltzer, E. and N.: Bone and Malt Mixture, 239.
Semecarpus albescens in Burma, 179.
Senderens, J. B., and P. Sabatier, New Method of Distinguishing Primary, Secondary and Tertiary Alcohols, 17.
Senecio vulgaris Fluid, Extract of, for Dyspepsia, 214.
Senft, E.: Microchemical Detection of Sugar, 157.
Senna, Confection of (Lenton), 247.
Shuttleworth, J. H.: Liniment of Potassium Iodide with Soap, 267.
Sheep Dips for Scab, 298.
Shrub, Raspberry, 317.
Sicilian Peppermint Oil, 126.
Silberrad, O.: Nitrogen Iodide, 118.
Simmons, W. H.: Iodine Absorption Value of Essential Oil of Rose, 149.
Simmons, W. H.: Refractive Index of Essential Oil of Cloves, 60.
Sinapis, Various Species of, in Commercial Mustard, 204.
Skimmianine from *Skimmia japonica*, 154.
Skin Balm, Emollient, 299.
Slade, H. B.: Alkaloids of *Zygadernus venenosus*, 168.
Smith, H. G., and R. T. Baker: Constituents of Eucalyptus Oils of Various Species, 73.
Smyrna Opium, Manipulated, 206.
Snavely, C. O.: Mercuric Nitrate Ointment, 269.
Snow, Camphor, 241.
Soap Coconut, Neutral, Sapophthalum, 283.
Soap, Detection of Sodium Silicate in, 154.
Soap, Malt Extract, 305.
Soap Paste, Petrolatum, Cosmetic, 315.
Soap, Ricin, 282.
Soaps, Stain-removing, 318.
Soden, H. von, and F. Elze: Essential Oil of Birch Buds, 48.
Sodium-Alum, 155.
Sodium Glycocholate for Hepatic Colic, 214.
Sodium Phosphate, Arsenic in, 43.
Sodium Salts, Detection of, by Modified Fremy's Reagent, 155.
Sodium Silicate in Soap, 154.
Solanum dulcamara, Cultivation of, 311.
Solubility of Quinine in Ammonia, 140.
Solution of Lead Subacetate, Stronger (Merson), 265.
Solutions of Zinc Iodide or Chloride, 290.
Sommeani Rape, 204.
Sonnie-Moret, —: Detection of Mercury in Urine, 112.
Sophora angustifolia, Matrine from, 111.
Sophora japonica, Sophorin in, 156.
Spanish Lavender Oil as Adulterant of French Oil, 102.
Spanish Rosemary Oil, 150.
Sparteine, Conine, and Nicotine, Tests for (Reichard), 116.
Spear Poison from the Cameroons (Brieger and Krause), 156.
Spermaceti in Suppositories, 284.
Sphæranthus indicus and *S. peguensis* in Burma, 180.
Spirit of Chaulmoogra, 242.
Stagnin, 215.
Stain for Gonococci, 301.
Stain-removing Soaps, 318.
Standardization in the New U.S.P., 394.
Standardization of Galenicals, 358.
Stapleton, W. S.: *Passiflora incarnata* as a Sedative, 210.
Starch-Glaze Powder, 304.
Starch, Liquid Cold-water, 304.
Stereospermum euphorioides Gum, 215.

Sterilized Catgut (Grimbert), 284.
Sternberg, L.: Acid Tincture of Ergot, 250.
Stevens, H. B., and E. W. Lucas: Compound Tincture of Cardamoms, 247.
Storage of Galenicals (Naylor), 366.
Storax, Tests for (Ahrens and Hett), 157.
Stramonium Candle, 295.
Stramonium Preparations Standardization of (Naylor), 370.
Strawberry Vinegar, 301.
Strebulus asper in Burma, 189.
Strong Solution of Lead Subacetate (Morson), 265.
Strophanthus kombé, and *S. eminii* in German East Africa, 202.
Strophanthus Preparations, Standardization of (Naylor), 370.
Strychnos quaqua, *S. leiocarpa*, *S. suberifera*, *S. behrensiana*, *S. goetzii*, *S. radiosperma*, *S. melonicarpa*, *S. cardiophylla*, *S. harmsii*, *S. pungens*, *S. engleri*, *S. euryphylla*, and *S. omphalocarpa* in German East Africa, 202.
Stuhlmannia moavi in German East Africa, 202.
Stypticine and Stypticine Gauze, Wool, and Lint, 270.
Styptol, 270.
Styracol, 215.
Sublimate Dressings, Assay of, 230.
Substances having Analogous Constitution to Pilocarpine (Jowett), 130.
Substitute for Rubber Gloves, 319.
Sugar, Microchemical Detection of (Senft), 157.
Sugar New, in Mountain Ash Berries, 157.
Sugar of *Cocos nucifera* and *Borassus flabelliformis*, 158.
Suppositories for Internal Hæmorrhoids, 284.
Suppositories, Spermaceti instead of Beeswax for Hardening, 284.
Suppositories of Witch Hazel and Hydrastis Extracts, 285.
Suppositories, Tannin, 286.
Surinam Copaiba (van Itallie), 68.
Sussex, The Flora of, 426.
Synonyms for Magnesium Sulphate, 320.
Syrup, Concentrated Iodo-, for the Preparation of Iodo-tannic Syrups, 264.
Syrup, Iodotannic (Grimbert), (Vigneron), 263; (Wyatt), (Martin), 264.
Syrup, Iodotannic, Phosphated, 2
Syrup Jars, To keep Ants from, 294.
Syrup, Maize Stigmata, 268.
Syrup of Calcium Lactophosphate, Improved (Hemm), 285.
Syrupus Pruni Virginianæ (H. G. Greenish), 285.
Syrupus Rhei (H. G. Greenish), 285.
Syrupus Tolutanus (H. G. Greenish), 285.
Syrups, Official, Improvements in Certain (H. G. Greenish), 285.

T.

Tacamahac Resin, 158.
Tacamahaca Elemi, 158.
Tanacetum boreale, Essential Oil of, 159.
Tannin Ovules, Suppositories and Pessaries (Grimbert), 286.
Tapeworm Remedy, 320.
Taraktogenos kurzii in Burma, 179.
Taraxacum, Liquid Extract of (Lenton), 268.
Taraxacum officinale, Cultivation of, 310.
Tartarated Antimony, Detection of $KHC_4H_4O_6$ in, 159.
Taxus baccata, Cultivation of, 312.
Tazwell, —: To keep Ants from Syrup Jars, 294.
Tea-Rose Oil, 148.
Telfairia pedata in German East Africa, 203.
Telle, F.: New Method of Determining the Br Absorption Value of Fats, 51.
Tephrosia vogelii in German East Africa, 202.
Terminalis oliveri, 178.
Test for Cinchonidine in Quinine Sulphate (Paul), 142.
Testing Quinine Sulphate (Duncan), 140.
Tetranthera polyantha var. *citrata*, Essential Oil of Bark and Leaves of, 159.
Thalassine in Prawns, 159.
Thalleioquin Reaction in Quinine Wine Prevented by Presence of Bitter Orange, 282.
Thanaka, 179.
Thansa, 178.

Thibault, P.: Organic Salts of Bismuth, 48.
Thomann, J.: Detection of Paraphenylenediamine in Hair Dyes, 124.
Thoms, H.: Constitution of Dill- and Parsley Apiol, 23.
Thoms, H.: Determination of Alkaloids with Potassium-Bismuth Iodide, 18.
Thoms, H.: German Opium, 236.
Thoms, H.: Matico Oil, 110.
Thoms, H., and A. Biltz: White Peruvian Balsam, 128.
Thorium Acid Urate, 440.
Thorium Camphor-sulphonate (Morgan), 162; (Martindale), 439.
Thorium Cinnamate (Morgan), 160; (Martindale), 438.
Thorium Glycerophosphate, 439.
Thorium Lactate (Morgan), 161; (Martindale), 439.
Thorium Oleate (Morgan), 160; (Martindale), 439.
Thorium Ortho-coumarate, 438.
Thorium Phenol-compounds, 160.
Thorium Para-phenyl sulphonate, 439.
Thorium Salicylate (Morgan), 160; (Martindale), 438.
Thorium Salts of Organic Acids for Medicinal Use, 160.
Thorium Quinate, 440.
Thorium Sulpho-carbolate (Morgan), 161; (Martindale), 439.
Thujone, 162.
Thymol Dentifrice, Miller's, 320.
Thymomenthol, 163.
Tincture of Camphor, Compound Analysis of, 459.
Tincture of Cardamoms, Compound (Lucas and Stevens), 247.
Tincture of Delphinium Seeds (O'Neil), 249.
Tincture of Ergot, Acid, 250.
Tincture of Gentian, Compound, 423.
Tincture of Immature Oranges for Diarrhœa, 215.
Tincture of Myrrh, Dispensing of, 270.
Tincture of Nux Vomica, Fat of, 471.
Tinctures, Official (Lucas and Dick), 288, 289.
Tinctures; Table of Analytical Results obtained by Irish Analysts, 495.
Tinctures, Water Displacement in Preparation of, 286.
Toad Venom, Action of Radium Emanations on, 320.
Tobacco and Sulphur Sheep Dip, 299.
Toff, E.: Xeroform Dusting Powder, 288.
Toilet Ammonia, 321.
Tollens, B., and J. Sack: Lupeol in *Roucheria griffithiana* Bark, 150.
Tomato, Red Colouring Matter of, 144.
Tonka Beans, Collection and Curing of, 215.
Tonsilitis, Guaiacum Lozenges for, 256.
Tooth Powders, Neutral, 313.
Tornani, E., and G. Bruni: Differentiation of Allyl and Propenyl Groups of Aromatic Compounds, 24.
Toxicity of Certain Aniline Colours, 293.
Toxicity of Essential Oils on the Living Cell, 321.
Toxicity of Iso-safrol, 303.
Toxicity of Red Blood-corpuscles of Various Animals on the Rabbit, 321.
Trehalase, General Presence of, in Fungi, 163.
Tragacanth and Acacia, Comparative Viscosity of the Simple and Mixed Mucilages, 485.
Transactions, B.P.C., 327–505.
Transfer Ink, Lithographic, 305.
Trichilia emetica in German East Africa, 203.
Trillat, A., and — Turchet: New Reaction for NH_3 in H_2O, 167.
Troeger, —, and — Bentin: Essential Oil of *Pinus strobus*, 132.
Trombidium grandissimum, a Medicinal Mite, 217.
Tschirch, A.: Rhubarb and the Plants Producing it, 211.
Tschirch, A., and — Christofoletti: Rhubarb and Aloes, Assay of, 145.
Tschirch, A., and — Hoffbauer: Valuation of Aloes, 19.
Tschirch, A., and O. Saal: Summary of Investigation of Elemis, 71–72.
Tschirch, A., and O. Saal: Tacamahac Resin, 158.
Tschirch, A., and O. Saal: Tacamahaca Elemi, 158.

Tuberculin (Gamble), 218.
Tungsten, Colour Reactions for, 164.
Turchet, —, and A. Trillat: New Reaction for NH_3 in H_2O, 167.
Turicine, 220.
Turkish Mustard, 204.
Turmeric, Composition of (Leach), 164.
Turpentine Oil, Detection of Adulteration in (MacCandless), 164.
Turpentine Oil, Greek, from *Pinus halepensis*, 165.
Typhoid, Erlich's Diazo-Reaction for, 298.
Tyrosine in Elderberries, 153.

U.

Umbelliferone Test Modified (Alcock), 165.
Umney, J. C., and C. T. Bennett: Essential Oil of *Eucalyptus polybracteata*, 80.
Umney, J. C., and C. T. Bennett: Essential Oils of the U.S.P., 404.
Umney, J. C., and C. T. Bennett: Sicilian Peppermint Oil, 126.
Umney, J. C., and C. T. Bennett: Suggested Official Characters and Tests for Cod Liver Oil, 64.
Umney, J. C., and C. A. Hill: Arsenic in Reduced Iron, 42.
Unguentum Acidi Carbolici (H. G. Greenish), 288.
Universal Healing Salve, 322.
Unna-Dreuw's Ointment for Psoriasis, 274.
Urine, Detection and Determination of Albumin in (Bellocq), 15.
Urine, Detection of Mercury in (Zenghelis), 111; (Sonnie-Moret), 112.
Urine, Nature of Red Colour of, after Administration of Pyramidon, 211.
U.S.P., Essential Oils of, 404.
U.S.P., New Standardization in, 394.
Utz, —: Determination of Iodoform, 97.
Utz, —: Greek Turpentine Oil from *Pinus halepensis*, 165.

V.

Valerian Juice, Physiological Action of, 220.
Valerian Root, Derbyshire, Botanical Source of, 220.
Valeriana officinalis, Cultivation of, 309.
Valeriana officinalis, *V. sambucifolia* and *V. mikanii*, 220.
Valiaschko, N. A.: Robinin, 147.
Validol for Sea-sickness, 221.
Vandevelde, A. J. J.: Toxicity of Essential Oils on the Living Cell, 321.
Vanillin Adulterated with Terpin Hydrate, 165.
Vanillin and HCl as a Reagent, 165.
Vanino, L., and J. Gaus: Phosphorescent Pastes and Masses, 316.
Vanino's Phosphorescent Mass, 316.
Vapour, Antiseptic, 294.
Vaseline Oil and Vaseline, 279.
Vasenol (Kopp), (Aufrecht), 288.
Velvet Violet Powder, 322.
Ventilago calyculata in Burma, 180.
Vidal, —: Euquinine in Mixtures, 251.
Vigneron, —: Determination of Quinine in Cinchona Bark, 137.
Vigneron, —: Iodotannic Syrup, 263.
Vilampishin, 191.
Villiers, —, Maynier de la Source, Rocques and Fayolle: Detection of Saccharin, 151.
Vinegar, Commercial, Acetylmethylcarbinol in, 166.
Vinegars, Fruit, 301.
Vioform and Vioform Gauze, 271.
Viola odorata Leaves, Chemistry and Pharmacy of, 466.
Violet Powder, Velvet, 322.
Violet Sachet Powders, 317.
Viscum orientale in Burma, 180.
Vitose (Aufrecht), 288.
Volatile Acids, Distribution and Formation of, in Plants, 166.
Volatile Oil. *See* Essential Oil.
Volumetric Determination of $BaCl_2$, 45.
Vorlaender's Asthma Powder, 296.
Vorontzoy, V. N.: Tincture of Immature Oranges for Diarrhœa, 215.
Vuillemin, A., and C. Hartwich: Commercial Mustard Seeds, 204.

W.

Wade, —, and — Finnemore: Chlorethoform, 182.
Wadmore, J. M.: Sodium-Alum, 155.

Wahl, A. von : Stain for Gonococci, 301.
Waldmann, — : Adulterated Aristol, 24.
Wallach, O. : Thujone, 162.
Walnut and Paraffin Hair Stimulant, 314.
Warin, J. : Determination of Active Principles in *Rhamnus frangula* Bark, 144.
Warts, Application for, 295.
Water, New Reaction for the Detection of Ammonia in (Trillat and Turchet), 167 ; (Cavalier and Arthus), 168.
Water Supplies, Purification of, with $CuSO_4$, 69.
Wax, Bees-, Detection of Adulteration of, by Examining Colouring Matter, 45.
Wax, Bees-, Indian (Hooper), 45.
Wax, Bees-, Saponification Value of (Schwarz), 46.
Wax, Japan, 98.
Wax, Linoleum and Floor, 304.
Wax, Polish, Laundry, 304.
Weil, L. : Precautions necessary in Prescribing and Dispensing Mesotan, 203.
Weisskopf, — : Chloroform as an Antidote to Nitrous Oxide Poisoning, 183.
Wesemberg, G. : Iothion, 197.
West Australian Poisonous Plants (E. M. Holmes), 221.
White, E. : Comparative Viscosity of the Simple and Mixed Mucilages of Acacia and Tragacanth, 485.
White Library Paste, 322.
White Peruvian Balsam, 128.
White Polishing Paste for Metal, 313.
Wiedmann, F. : Detection of Rancid Fats in Alimentary Substances, 143.
Wielen, P. van der : Cacao Butter Soap Dentifrices, 239.
Wielen, P. van der : Javan Peppermint Oil, 125.
Wielen, P. van der : Sapophthalum, Neutral Coconut Soap, 283.
Wilbert, M. I. : Camphor Milk, 241.
Wilbert, M. I. : Camphor Snow, 241.
Wilbert, M. I. : Glycerin Jelly, 254.
Wild-Borbeck, E. : Eserinol, 251.
Wine, Creosote, 249.
Wine, Iodotannic, Phosphated, 280.
Witch Hazel and Hydrastis Suppositories, Basis for, 285.
Witch Hazel Cream, 277.
Wood-apple Gum, 191.
Woehlk, A. : New Reaction for Lactose, 100.
Wool, Capsicum, 455.
Wool, Euguform, 271.
Wool, Isoform, 271.
Wool, Quinine Lygosinate, 271.
Wool, Stypticine, 270.
Wools, Medicated, Assay of, 229.
Wright, R. : Occurrence and Distribution of Mydriatic Alkaloid in *Lactuca muralis*, 101.
Wright, R., and E. H. Farr : Powdered Alcoholic Extract of Belladonna Leaf, Standardized, 232.
Wright, R., and E. H. Farr : Powdered Alcoholic Extract of Belladonna Root, Standardized, 236.
Wyatt, H. : Citrate of Iron and Quinine in Mixtures, 245.
Wyatt, H. : Hypophosphorous Acid in Dispensing, 257.
Wyatt, H. : Insoluble Powders in Mixtures, 262.
Wyatt, H. : Iodotannic Syrup, 264.
Wyatt, H. : Manipulation of Bark Mixtures, 231.
Wyatt, H. : Manipulation of Copaiba Mixtures, 248.
Wynne, W. P., and J. S. Hills : Linin, 107.

X.

Xanthium strumarium in Burma, 181.
Xeroform Dusting Powder, 288.
Xylocarpus granatum in German East Africa, 202.

Y.

Yellow Mercuric Oxide Ointment, 269.
Yohimbi Bark, False, 191.
Young, D. A. : Compound Galbanum Pills, 253.

Z.

Zelis, P. : Formalin Dressings, 252.
Zelis, P. : New Dressings, 270.
Zenghelis, — : Detection of Traces of Hg in Urine, 111.

Zepf, P.: Therapeutics of Emetine and Cephæline Hydrochloride, 185.
Zernik, F.: β-eucaine Lactate, 176.
Zernik, F.: Exodin, 191.
Zernik, F.: Griserin, 195.
Zernik, F.: Isopral, 198.
Zernik, F.: Perhydrol, 210.
Zeuner, W.: Guaiacum Lozenges for Tonsilitis, 256.
Ziegelmann, E. F.: Essential Oil of Savin, 153.
Zinc Borate or Oxyborate, 168.
Zinc Chloride and Iodide Solutions, 290.
Zinc Chloride Pencils, 290.
Zinc Labels, Ink for, 303.
Zinc Sulphide, Phosphorescent, 129.
Zygadernus venenosus Bulbs, Alkaloids of, 168.

ADVERTISEMENTS.

TRADE MARK 'SOLOID' Brand

PRODUCTS

REMEMBER THE BRAND

The attention of pharmacists is especially directed to the 'Soloid' Products for Urine, Water and Sewage Analysis; also to the 'Soloid' Stains for Microscopy. They offer profitable opportunities.

REGISTERED *BEWARE OF IMITATIONS.* REGISTERED.

BURROUGHS WELLCOME AND CO., LONDON, E.C

481 Kent Street, Sydney N S W, and 77, Long Street, Cape Town

[COPYRIGHT] F 264t

Eighth Edition. Tenth Thousand. Price 5s. net.

INCE'S LATIN GRAMMAR

FOR THE USE OF

Medical and Pharmaceutical Students.

By JOSEPH INCE, A.K.C., F.C.S., F.L.S., F.R.M.S.,

Late Lecturer in Pharmacy to the Pharmaceutical Society of Great Britain.
Formerly Examiner and Member of Council.

LONDON: BAILLIÈRE, TINDALL & COX, 8, HENRIETTA ST., STRAND.

Now Ready. Eleventh Edition.

With numerous additions and revisions. Medium 24mo, 9s 6d. *net* (by post 9s. 9d.).

THE EXTRA PHARMACOPŒIA

Of MARTINDALE AND WESTCOTT.

Revised by W. HARRISON MARTINDALE, Ph.D., F.C.S., and W. WYNN WESTCOTT, M.B.Lond., D.P.H., etc.

"No one engaged in Medicine or Pharmacy can afford to be without a copy of the latest edition of this valuable work of reference."—*British Medical Journal.*

A copy of Dr. Martindale's Synopsis of the New United States Pharmacopœia is presented to purchasers of the "Extra Pharmacopœia."

London: H. K. LEWIS, 136, Gower Street, W.C.

NEW EDITION, 18th. EDITED BY DR. DOBBIN. **Recently Issued. 15s.**

ATTFIELD'S CHEMISTRY.

For Library, Study, Laboratory, Lecture Room, Office, Shop.

"*A necessary adjunct to every pharmacy.*"—PHARM. JOURNAL.

GURNEY & JACKSON, 10, Paternoster, Row, London.
(*Successors to Mr. VAN VOORST.*)

ABERDEEN SCHOOL OF PHARMACY.

The Day Classes commenced on Monday, 28th August, with short course in preparation for October Examinations.

Ordinary Terms begin October, January, April. Evening Classes began on 25th September.

Teacher: GILBERT SIMPSON, Ph.C.

Prospectuses on application to Secretary, Robert Gordon's College, Aberdeen.

With 371 Engravings. 2 Vols. 42s.

Cooley's Cyclopædia of Practical Receipts

and Collateral Information in the Arts, Manufactures, Professions and Trades, including Medicine, Pharmacy, Hygiene, and Domestic Economy. Seventh Edition. By WILLIAM NORTH, M.A., F.C.S., assisted by several scientific contributors.

London: J. & A. CHURCHILL, 7, Great Marlborough Street.

J. & A. CHURCHILL'S LIST.

CHEMISTRY AND BOTANY.

Researches on the Affinities of the Elements, and on the Causes of the Chemical Similarity or Dissimilarity of Elements and Compounds. By GEOFFREY MARTIN, B.Sc., Lond. With Woodcuts, and Tables. 16*s.* net.

The Elements of Chemistry. By M. M. PATTISON MUIR, M.A., Fellow and Praelector in Chemistry of Gonville and Caius College, Cambridge. Illustrated. 10*s.* 6*d.* net.

The Chemical News says: "This most admirable and original text-book . . . a scholarly and readable account of the principles of the science put forward in logical order. . . . The student ought to obtain a first-rate knowledge of the subject and to gain a very interesting insight into the philosophy of the science."

The Microtomist's Vade-Mecum: A Handbook of the Methods of Microscopic Anatomy. By A. B. LEE. Sixth Ed. 15*s.* net.

Allen's Commercial Organic Analysis. Prospectus on application.

Volumetric Analysis; or, the Quantitative Estimation of Chemical Substances by Measure, applied to Liquids, Solids, and Gases. By FRANCIS SUTTON, F.C.S., F.I.C. Ninth Ed. 121 Engravings. 20*s.* net.

The Analyst's Laboratory Companion. A Collection of Tables and Data for Chemists and Students. By ALFRED E. JOHNSON, B.Sc., F.I.C. Third Edition. 6*s.* 6*d.* net.

The Chemistry of the Terpenes. By DR. F. HEUSLER. Translated by F. J. POND, Ph.D. 17*s.* net.

Introduction to Chemical Analysis. By HUGH C. H. CANDY, B.A., B.Sc., F.I.C., Lect. on Chem. Lond. Med. Coll. 3*s.* 6*d.* net.

A Handbook of Physics and Chemistry. By H. E. CORBIN and A. M. STEWART. Second Ed. 153 Illustrations. 6*s.* 6*d.*

Chemistry, Inorganic and Organic. By C. L. BLOXAM. Ninth Ed. by J. M. THOMPSON, F.R.S., Prof. of Chem., King's College, Lond. and A. G. BLOXAM, F.I.C. 284 Engravings. 18*s.* net.

By JOHN C. THRESH, M.D.

The Examination of Waters and Water Supplies. 19 plates and 11 Figures in the Text. 14*s.* net.

A Simple Method of Water Analysis. Fifth Edition, enlarged. 2*s.* 6*d.*

By Profs. CLOWES and COLEMAN.

Practical Chemistry and Qualitative Analysis. Seventh Edition. 101 Engravings and Frontispiece. 8*s.* 6*d.*

Quantitative Analysis. Sixth Edition. 125 Engravings. 10*s.*

Elementary Practical Chemistry. Fourth Edition. Part I. General Chemistry. 75 Engravings. 2*s.* 6*d.* net. Part II. Analytical Chemistry. 20 Engravings. 2*s.* 6*d.* net.

By J. REYNOLDS GREEN, Sc.D., M.A., F.R.C.S.,
Professor of Botany to the Pharmaceutical Society.

Manual of Botany, in Two Vols. Vol. I. Morphology and Anatomy. Third Edition. 778 Engravings. 7*s.* 6*d.* Vol. II. Classification and Physiology. Second Edition. 466 Engravings. 10*s.*

An Introduction to Vegetable Physiology. 184 Illustrations. 10. 6*d.*

London: J. & A. CHURCHILL, 7, Great Marlborough Street.

Charing Cross Hospital Medical School.

The Livingstone Scholarship (100 guineas), the Huxley Scholarship (55 guineas), and six other Entrance Scholarships (total value £550) are awarded annually.

Two Scholarships, of the value of 72 guineas each, are reserved for Students of Oxford, Cambridge, or London Universities.

FEES (including Subscription for Students' Club).—For the five years' curriculum of study required by the various examining bodies and for Hospital Practice, 115 guineas in one sum, or 126 guineas in five instalments.

The composition fee for sons of registered medical practitioners is 105 guineas, and the fee by instalments 115 guineas in five payments.

The composition fee for Dental Students is 55 guineas, or 61 guineas payable in two instalments of 31 guineas and 30 guineas respectively.

A proportionate reduction of the above fee is made to Students who have completed part of the curriculum elsewhere.

APPOINTMENTS.—The opportunities for obtaining Resident Hospital and other appointments after qualification—of which there are upwards of 30—are specially favourable.

CHARING CROSS HOSPITAL is within three minutes' walk of the Royal Dental Hospital of London, and the hours of Lectures are arranged to suit the convenience of both General and Dental Students.

The Hospital and School are situated within two minutes of both Charing Cross Stations, and the Athletic Ground at Eltham can be reached within half an hour from Charing Cross.

The SCHOOL PROSPECTUS, containing full information concerning the classes, prizes, and all other arrangements connected with the Medical School, will be sent on application to the Dean, 62-65, Chandos Street, Strand, W.C.

HERBERT F. WATERHOUSE, DEAN.

The Royal Dental Hospital

AND

LONDON SCHOOL OF DENTAL SURGERY,

Leicester Square, London, W.C.

The Royal Dental Hospital was founded in 1858 at Soho Square, and in March, 1874, was removed to Leicester Square. The increased demands made on it by the public and the rapid growth of the Medical School necessitated the erection of an entirely new building. The new Hospital was opened in March, 1901, and is complete in every detail with modern appliances, and the school portion of the building thoroughly equipped for teaching purposes. The clinic of the Hospital is unrivalled. In 1904 the number of the cases treated was 99,458, being 1,628 in excess of the preceding year.

The HONORARY MEDICAL STAFF consists of six Dental Surgeons, six Assistant Dental Surgeons, and four Anæsthetists.

Five House Surgeons are appointed every six months.

Four Operative and two Mechanical Demonstrators assist Students in their practical work.

INSTRUCTION IN MECHANICAL DENTISTRY.

The instruction in Mechanical Dentistry as required for the Dental curriculum can be obtained at this Hospital.

Further particulars concerning fees, scholarships, etc., can be obtained on application to—

THE DEAN.

Established 1797.

Grand Prix, Paris 1900.

HOWARDS & SONS, LTD.

Telegraphic Address: "Quinology, London.'

QUININE, CINCHONA ALKALOIDS.

Acetates of Soda and Potash.
Acids, Pure.
Æthers, pure and methylated.
Antimony preparations.
Benzoic Acid and Benzoates.
Bicarbonate of Soda (Howards')
Bismuth Salts, including Salicylas.
Borax and Boracic Acid.
Bromides of the Alkalies.
Caffeine and Citrate, P.B.
Calomel.
Camphor Bells, Blocks and Flowers.
Citrate of Iron and Quinine, P.B.
Citric Acid and Citrates.
Cocaine and its Salts.
Corrosive Sublimate.
Ext. Cinch. Liq. P.B., and H. & S
Iodides of the Alkalies
Iodoform
Liq. Bismuthi et Am. Citratis.
Magnesia.
Mercurials.
Rochelle Salt and Pulv. Seidlitz.
Scale Preparations.
Spirit preparations, and for Export under drawback.
Terebene.
Zinc and Iron Sulphates, etc.

AND OTHER PHARMACEUTICAL CHEMICALS.

STRATFORD, ESSEX.

The above Preparations may be obtained in ORIGINAL PACKAGES through any Wholesale Druggist.

HOWARDS & SONS, Ltd., wish to draw special attention to their QUININE TABLETS and QUININE PILLS.

Hopkin & Williams, Ltd.

Telegraphic Address. "Cerium, London."

Manager:
EDMUND WHITE,
B.Sc., F.I.C., etc.

The FINEST CHEMICALS for Pharmacy, Research, Photography . . . . .

16, CROSS STREET, HATTON GARDEN,
LONDON, E.C.

EVANS

For DRUGS AND CHEMICALS.
For PHARMACEUTICAL
PREPARATIONS.
For ESSENTIAL OILS.
For COATED PILLS, CAPSULES,
COMPRESSED TABLETS, &c.
For Counter Adjuncts, Customers' Names and Addresses.
For Druggists' Sundries.
For Photographic Requisites.
For Patent Medicines, Proprietary Articles, &c.
For Shop Fittings, Counter Cases, &c.

COMPLETE DISTINCT LISTS FOR EACH DEPARTMENT.

EVANS SONS LESCHER & WEBB Ltd.

LIVERPOOL & LONDON.

EVANS SONS LESCHER & WEBB

LIMITED,

LIVERPOOL AND LONDON.

(EVANS, SONS & CO.) (EVANS, LESCHER & WEBB.)

Wholesale and . .
. . Export Druggists

MANUFACTURING CHEMISTS,

DISTILLERS OF ESSENTIAL OILS

PIONEERS of COUNTER ADJUNCTS

Bearing Customer's Name and Address.

Dealers in and Manufacturers of

DRUGGISTS' SUNDRIES.

PHOTOGRAPHIC REQUISITES . .
. . PATENT MEDICINES, AND . .
. . . PROPRIETARY ARTICLES

Telegrams:
"UMNEY, LONDON."

WRIGHT, LAYMAN AND UMNEY'S TRIPLE MILLED TOILET SOAPS.

ALL our Toilet Soaps are prepared from the purest edible fats, and are free from obnoxious colouring matters and adulterants, and delicately scented with the finest Perfumes.

Brown Windsor
Buttermilk
Cold Cream
Curd
Glycerine and Cucumber
Golden Lily
Honey
Lavender
Oatmeal
Parma Violet
Rose
Rose (White) and Cucumber
Superfatted Skin

Packed in attractive Cardboard Boxes, each containing one dozen Tablets.

18/-

Per dozen Boxes.

Sample Box, 1/9 post free.

These Soaps are also packed in Cardboard Boxes, containing 3 Tablets, both Wrappers and Box Labels being artistically finished and printed in numerous colours.

23/-

Per gross Tablets.

WRIGHT, LAYMAN & UMNEY, LIM., SOUTHWARK, S.E.

WE GRIND ALL OUR DRUGS

and we exercise fullest Analytical Control, therefore
WE CAN ABSOLUTELY GUARANTEE

ALL our Powders Genuine and Correct

as regards

ASH PERCENTAGE
(Gamboge, Saffron, etc.)

RESIN PERCENTAGE
(Jalap, Scammony, etc.)

ALKALOID PERCENTAGE
(Cinchona, etc.)

❧

Telegrams: "UMNEY, LONDON."
Telephone: 608 HOP.

❧

WRIGHT,

LAYMAN

AND

UMNEY, Ltd.

SOUTHWARK,
LONDON, S.E.

GOLD MEDAL and DIPLOMA, PARIS, 1900.

J. F. Macfarlan & Co.

MANUFACTURERS OF

MORPHIA and its SALTS
CODEIA and its SALTS

All other OPIUM products and its synthetic derivatives

DIACETYL MORPHINE HYDROCHLORIDE
ETHYL MORPHINE HYDROCHLORIDE

These Esters were fully investigated by Stockman and Dott in 1887–88, and have since been sold by us under their systematic names as above. Subsequently they were made by Continental firms and sold under the protected names "Heroin" and "Dionin."

PURE CHLOROFORM

(Answering British Pharmacopœia and all Official Tests.

ANÆSTHETIC ETHER.

(As used by the late Dr Thos. Keith and other eminent Surgeons.)

SPIRITUOUS GALENICALS OF B.P. 1898.

Prepared and standardised in our own Laboratories for Export under Bond.

ANTISEPTIC DRESSINGS AND APPLIANCES.

Used in the Listerian System of Surgery, prepared according to the Special Formulæ of LORD LISTER, ex-P R.S.

EDINBURGH Address—
93 & 109, Abbeyhill.

LONDON Address—
9 & 11 Moor Lane, Fore St., E.C.

FINE CHEMICALS for Scientific purposes and for College and Technical Institute Laboratories.

PHARMACEUTICAL CHEMICALS of Standard Quality for Manufacturing and Dispensing.

PHOTOGRAPHIC CHEMICALS in Bulk or ready Packed for Retailing.

RADIUM PREPARATIONS and MINERALS.

MINERAL and GEOLOGICAL SPECIMENS and SETS.

TECHNICAL CHEMICALS for Glass, China, Enamel, Varnish, and other manufacturing purposes.

HARRINGTON BROS.

Telegraphic Address—
SICCATIVE, LONDON.

Manufacturing Chemists,

Telephone No —
10586 Central.

4, OLIVER'S YARD, CITY ROAD, LONDON, E.C.

THOMAS TYRER & CO., Ltd.

Stratford, London,
1844 **England.** 1905

GOLD MEDAL, St. Louis, 1904.

ANALYTICAL, PHARMACEUTICAL, PHOTOGRAPHIC,
TECHNICAL AND SPECIAL CHEMICALS.

Practitioners are requested to Specify TYRER'S Manufacture when ordering from Wholesale Houses.

Sterling Brand =

- BISMUTH SALTS
- ETHERS
- HYPOPHOSPHITES
- MERCURIALS
- PHOSPHORIC ACID
- SCALE PREPARATIONS
- CHEMICALS FOR
  - METALLURGY
  - ASSAYING
  - ANALYSIS
  - PHARMACY
  - PHOTOGRAPHY

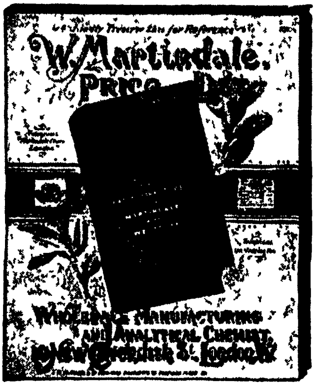
TECHNICAL EXPERIMENTS

ON A MANUFACTURING SCALE
CARRIED OUT. - - - - - - -

ENQUIRIES SOLICITED FROM

- - Inventors, Patentees, &c.

Telegrams: "TYRER, STRATFORD, LONDON."


W. Martindale's Price ...
Wholesale Manufacturing and Analytical Chemist, 10 New Cavendish St. London W.

W. MARTINDALE,

WHOLESALE & EXPORT CHEMIST.

Telegrams
“Martindale,
Chemist, London.”

MONTHLY PRICE LIST
(Up-to-date.
We hold stock of ALL NEW PREPARATIONS)
post free.

Telephones:
1797 Paddington
4688 Gerrard.

We supply the Trade with Chemicals, Drugs, Galenicals, and Surgeons' and General Sundries at moderate prices.

Quotations per return post.

10, New Cavendish Street, London, W.

Animal Extracts

WILLOWS, FRANCIS, BUTLER, and THOMPSON, Ltd.

40, ALDERSGATE ST., London, E.C.

TO WHOLESALE AND EXPORT TRADES.

W. RANSOM & SON

(Established Half a Century),

Manufacturing Pharmaceutical Chemists,

Distillers of Essential Oils and Cultivators of Medicinal Plants,

HITCHIN, near LONDON.

SPECIALITIES:—

Solid and Liquid Extracts.
Expressed Juices.
Essential Oil of Lavender.
Essential Oil of Peppermint.
Scammony Resin.
Jalap Resin.
Elaterium.
Mercurial Pill and Ointment.
Dried Medicinal Leaves.
English Aconite Root.
Aloin.
English Dandelion Root.

Medicinal Tinctures, Spirits, etc., of best quality supplied in bond for export.

International Exhibitions—London, 1862, Chicago, 1893. Prize Medals awarded for Pharmaceutical Extracts, Essential Oils, and Dried Herbs of Superior Quality.

Also Award at the Paris Exhibition, 1867.

1855.
Medal, Paris.

1862.
Honourable Mention, London.

1865.
Medal, Dublin.

Drugs, Chemicals, and Pharmaceutical Preparations.

HIRST, BROOKE & HIRST, LTD.,

WHOLESALE DRUGGISTS AND MANUFACTURING CHEMISTS,

MILLGARTH MILLS, LEEDS,

Manufacturers of

Pharmaceutical Preparations:

Acetic Acid; Liq. Ammon. Fort.; Mercurial Ointments; Tasteless Coated Pills; Medicated Bougies; Pessaries; Suppositories; etc., etc.

ALSO OF BRITISH WINES; HIGHLY PERFUMED TOILET SOAPS AND PERFUMERY, ETC., ETC.

DRUG GRINDERS.

Finest Non-freezing COD LIVER OIL, "WHITE BEAR BRAND."

ORANGE-QUININE WINE.

POTTER and CLARKE

. . . **THE HOUSE FOR** . . .

Herbs, Roots - - and Barks.

FLUID EXTRACTS.

POTTER'S ASTHMA CURE.

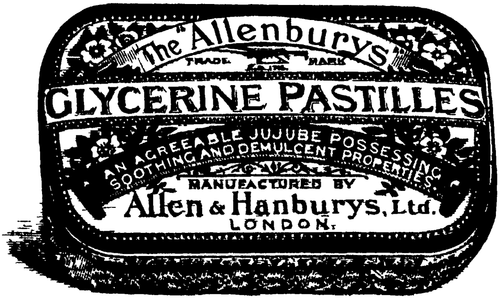
POTTER & CLARKE, Wholesale Druggists,
60, 62, 64, Artillery Lane,
LONDON, E.

Herb Farms: Carshalton, Mitcham, SURREY.

Jujubes and Pastilles

IN FREE TINS.

Of very superior flavours and of excellent brilliance and finish. Chemists desiring to put forward a speciality of their own can have Jujubes and Pastilles manufactured for them of any colour, flavour, or shape, provided that not less than 56 lbs. be ordered at a time.



JUJUBES AND PASTILLES.

- Aniseed Liquorice.
- Black Currant.
- Delectable.
- Glycerine.
- Glycerine and Black Currant.
- Lichen.
- Liquorice.
- Magnum Bonum.
- Pectoral.
- Pine.
- Raspberry.
- Rose.
- Tamarind,
- Violet.
- Voice.

JUJUBES and PASTILLES in Bulk, tins free, or put up for retail sale in ornamental boxes.

ALLEN & HANBURYS LTD.,

. . BETHNAL GREEN, LONDON.

C. F. Boehringer & Soehne

Mannheim-Waldhof, Germany.

COCAINE.

SULPHATE OF QUININE

And all other Cinchona Preparations.

Atropine, Caffeine, Chloral Hydrate, Hydroquinone, Codeine and its Salts, Cumarin, Gallic Acid, Lactophenine, Phenacetin, Terpin-Hydrate, Theophyllin, Strychnine, Vanilline, etc.

Agents for England and Ireland—
MESSRS DOMEIER & CO., LTD., 20 & 21. HARP LANE, GREAT TOWER ST., [LONDON, E.C.

Agents for Scotland—
MESSRS. F. R. MULLER & CO., 47, WATERLOO STREET, GLASGOW.

Highest Award, "GRAND PRIX," PARIS, 1900.

T. & H. SMITH
LIMITED,

21, Duke Street, EDINBURGH;
22, City Road, LONDON, E.C.;
37, Washington St., GLASGOW.
United States Agency
GUSTAV MARTIN,
38 PEARL STREET, BOSTON.

MANUFACTURERS OF
MORPHINE AND CODEINE
AND THEIR SALTS.
ERGOTIN.
CANTHARIDIN.
SALICIN.
ALOIN.
APOMORPHINE.
CAPSICINE.
CINCERINE.

CHLOROFORM.
Absolutely PURE, and answers all Official Tests.
CHLOROFORM RECT.
From Alcohol.
JALAP RESIN.
SCAMMONY RESIN.
SCAMMONIN.
JALAPIN.
Inventors and Sole Manufacturers of the
TELA VESICATORIA
or Blistering Tissue,
By far the most efficient Cantharides Vesicant in existence.

FULL ILLUSTRATED LISTS FREE

RUBBER STAMPS

Chemists' Stamps, Seals and Stencils a Speciality,
Window Ticket Marking Sets.

C. D. RICHFORD,
8 & 9, SNOW HILL, LONDON, E.C.
ESTABLISHED 26 YEARS.

Cadbury's Cocoa

ABSOLUTELY PURE, therefore BEST.

Cadbury's is "The Typical Cocoa of English Manufacture, Absolutely Pure."—*The Analyst.*

NO CHEMICALS USED IN CADBURY'S AS IN SO-CALLED PURE FOREIGN COCOAS.

THOMAS WHIFFEN,

BATTERSEA, LONDON,

MANUFACTURER OF

CAFFEINE AND EMETINE,
QUININE AND ALL CINCHONA SALTS,
STRYCHNINE ("HULLE'S"),
QUINETUM AND QUINETUM SULPHATES,
LIQUID EXTRACT OF CINCHONA, P.B., 1898,
. AND .
LIQUID EXTRACT OF CINCHONA FLAVA, P.B., 1867
EXTRACT NUCIS VOMICÆ LIQUIDUM, P.B., 1898,
SALICINE.

Telegraphic Address—"WHIFFEN, LONDON."

GEORGE ATKINSON & CO.,

31 & 32, St. Andrew's Hill, London, E.C.

Works—SOUTHALL, MIDDLESEX.

Telegraphic Address—"CAMPHOR, LONDON."

Specialities:

ANTIMONY and its Preparations.
IODOFORM and Iodine Resublimed.
POTASSIUM BROMID and Bromine Preparations.
POTASSIUM IODID and Iodine Preparations.
VERMILION and other Mercurials.
SANDALWOOD OIL. CLOVE OIL.
REFINED CAMPHOR, in Bells and Flowers.

TABLETS, from ½-oz. to 16 oz. each.

OIL PRESSERS AND DISTILLERS,

DRUG GRINDERS, etc., etc.

Quinine Wine,

B.P.

BUYER'S OWN NAME ON LABEL

Orange Wine.

In strict accordance with the requirements of the British Pharmacopœia.

The above both Perfectly fermented Wines.

LIME JUICE CORDIAL.

LEMON SQUASH. LEMON SYRUP.

Only the Finest Quality.

G. Y. HOME & CO.,

RECTIFIERS AND BRITISH WINE MAKERS, BRISTOL.

ESTABLISHED 1841.

DR. RENNER'S

Establishment for Vaccination with Calf Lymph,

75, Upper Gloucester Place, LONDON, N.W.

THE OLDEST ORIGINAL CALF VACCINE INSTITUTION IN THIS COUNTRY.

Prices of Calf Lymph (Glycerinated).

"Large" Tubes	**2s. each, or 3 for 5s.**
"Small" ditto	**1s. each, or 3 for 2s. 6d.**
"Half" ditto	**8d. each, 2 for 1s., or 6 for 2s 6d.**

VIALS.

(Concentrated Glycerized Pulp.)

"Large" (sufficient for 60-80 Vaccinations)	**10s. 6d. each.**
"Small" (half)	**5s. 6d. each.**

COUGHS.—American Cherry Pectoral,

FOR THE CURE OF

Coughs, Colds, Influenza, Hoarseness, Bronchitis, Incipient Consumption,

and affording the greatest relief in advanced stages of Disease.

In Bottles, at 1s. 1½d., 2s. 9d., 4s. 6d., and 11s.

Also CHERRY PECTORAL LOZENGES for Coughs, etc.

1s. 1½d. and 2s. 9d.

BRADLEY & BOURDAS, 48, Belgrave Road, and 8, Pont Street, Belgrave Square, London, S.W.,

and may be had of all Chemists.

Telegraphic Address—"BOURDAS, LONDON." Telephone—721, Westminster.

STANDARDISED PHARMACEUTICALS.

FLUID EXTRACTS. POWDERED EXTRACTS. CONCENTRATIONS.
PILLS—GELATIN-COATED AND SUGAR-COATED.
COMPRESSED TABLETS—CHOCOLATE-COATED, SUGAR-COATED, AND PLAIN.
TABLET-TRITURATES. . HYPODERMIC TABLETS.
MEDICINAL ELIXIRS AND SYRUPS.
SPECIALITIES OF WORLD-WIDE REPUTATION

ALL DRUGS ISSUED BY US ARE
PHYSIOLOGICALLY OR
CHEMICALLY STANDARDISED.

ORGANIC PRODUCTS

Of Absolute Reliability:

PHYSIOLOGICALLY STANDARDISED.

ADRENALIN, the Active Principle of the Suprarenal Gland. First isolated by Takamine, and prepared only by us. The most powerful hæmostatic and ischæmic known.

Solution Adrenalin Chloride, 1 : 1000.
"EUDRENINE" for painless and bloodless operations.
Suprarenal Tablets, each representing 2 grains of Desiccated Gland.
Thyroid Powder; Thyroid Tablets.
Thyroidectin, prepared from the blood of thyroidectomised animals.
Thymus Gland, in capsules.

PARKE, DAVIS & CO.,

111, QUEEN VICTORIA STREET, LONDON, E.C.
Telegraphic Address: "Cascara, London."

P.A.T.A.

ATKINSON & BARKER'S

Royal Infants' - -
- - Preservative.

Established 1793.

SUPPLIED TO HER LATE MAJESTY QUEEN VICTORIA.

Has been placed on the Protected List of the Proprietary Articles' Trade Association.

Minimum Prices—1/1½ size, 1/-; 2/9 size, 2/6; 4/6 size, 4/-.

Proprietors—R. BARKER & SON, 11, Russell Street,
MANCHESTER.

Lac Bismuth, Lac Bismuthi et Cerii.
Syr. Hypophos. Hydrobrom.

½-lb. & 1-lb. bottles, **20/- lb.**

OL. LAVAND. RECT.

5-lb. bottles, **19/- lb.**

Miniature Throat Spray,
Chloride of Ammonium Inhalers, etc.

SYMES & CO., LTD., LIVERPOOL.

London Agents—THOS. KERFOOT & CO., 189, Holloway Road, N.

FOUND DEAD.

KILLED BY SANFORD'S RAT POISON.

Which is said by Farmers to be the best and most effective ever introduced. Mr. Bliss, Farmer, Helethorpe, Leighton, writes that from one dressing he found 136 dead Rats next morning. Ald. Ashton, of Huntington, says he killed 70 Rats with a 1s. box of SANFORD'S RAT POISON. J Long, Esq., of Carlton, states that he found over 300 Rats killed by using a 10s. tin of Poison. Price 6*d*., 1s., 2s., 3s., and 5s. per tin. To be had of all Chemists, or **SANFORD & SON, SANDY, BEDS.**

Wholesale of Maw, San & Soni, Newbury & Son, Edwards & Son, and others, London.

FREDERICK FINK & CO.,

10, 11, MINCING LANE, LONDON, E.C.

SPECIALITIES:

Glycerine, Hand-picked Gum Arabic and Gum Arabic in sorts, Gum Tragacanth, Pure Beeswax and Honey.

Telegraphic Address—
"POTHS, LONDON."

Telephone Nos.—
1365 } Avenue.
1381

H. POTHS & CO.

4, 5, & 6, Bury Court, St. Mary Avenue, LONDON.

SHOP BOTTLES and JARS with Vitrified Labels
SHOW BOTTLES, GRADUATED MEASURES & MEDICINE
TUMBLERS, PERFUME BOTTLES, BOXES, etc.

New Illustrated Catalogue free. Also large list of Inscriptions specially arranged so as to reduce to a minimum the labour of making out orders and lists for same.

OL. RICINI.
ÆTHER
SYR. AURANT.
TINCT. ACONIT.
POISON
ACID. NITRIC.
TINCT. RHEI CO.
SODA BICARBON.
SPIRI VINI REC
TINCT. KRAMER.
OL. NUC CO.
AMMON CARB
UNGT. LANOLIN
MEL ANGLI

C. R. HARKER, STAGG and MORGAN, Ltd.,

Manufacturing Chemists, Wholesale and Export Druggists,

15, LAURENCE POUNTNEY LANE, LONDON, E.C.

ARE REMOVING TO

NEW PREMISES

AT

DEVON WHARF,

Emmott Street, Mile End, LONDON, E.,

Where their Laboratories are being fitted with Electric Power and the most modern pharmaceutical machinery and appliances.

Telegraphic Address : "EDULCINE, LONDON." Telephone : 949 (Bank).

RAIMES & CO., YORK

(SLINGER & SON. Incorporated 1899),

Wholesale Druggists & Manufacturing Chemists.

Specialities :
- ***LIQ. VIOLÆ OONO. 1-15.***
- ***LIQ. RHŒADOS OONO. 1-7.***
- ***SYR. RHŒADOS.***

PROPRIETORS OF

SLINGER'S NUTRIENT SUPPOSITORIES.

ALFRED WHITE & SONS,

MANUFACTURING CHEMISTS,

Established 1775.

Manufacturers of Acids,—Æthers,—Sp. Æther. Nit.,—Sp. Ammon. Arom.,—Liq. Ammon.,—Soldering Solution,—etc., and preparations of Alum,—Animal Charcoal,—Antimony,—Baryta,—Bismuth,—Strontia,—Tin,—Zinc,—etc.

ALLEN STREET, GOSWELL ROAD, E.C,

(Late Castle Street, Saffron Hill, E.C.)

WORKS:—WEST DRAYTON, MIDDLESEX.

Telegraphic Address:—"ETHER METHYLATED, LONDON."

Royal Balsamic Plaisters,

AS SUPPLIED TO THE ARMY AND NAVY
AT SCUTARI HOSPITAL.

Makers of Every Description of

PLAISTERS **In the Most Approved Form.**

Surgical Plaisters in Indiarubber Combination,

Porous and Plain.

In order to meet the largely increased demand for our Rubber Combination Plaisters, new and additional machinery has been laid down, and we now possess every facility for the production of Perfect Plaisters, and are in a position to execute orders without delay.

MATHER'S **Chemical**

FLY PAPERS

For Poisoning Flies, Wasps, Ants, Mosquitoes, etc.

SPECIAL PRICES ON APPLICATION.

Any Registered Chemist in Business who has not received a Poison Book and Sample Fly Paper per post, can have them on application.

W. MATHER, Ltd.,

Dyer Street, Hulme, MANCHESTER.

London and Export Agents—

Messrs. MACE & HALDANE, 94, Milton Street, E.C.

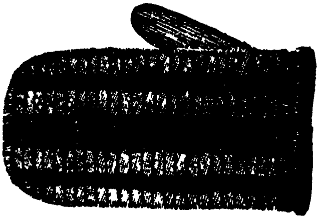
DINNEFORD & CO.

MANUFACTURERS OF

Horse-Hair Friction Gloves, Belts,

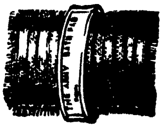
Etc., Etc.

WHOLESALE PRICE LIST.



Gent's Flesh Gloves
(in Pairs) For dry use only
No. 1 size, 36s., No 2, 40s., No 3,
42s. per doz. pairs.

Ladies' Flesh Gloves
(in Pairs) For dry use only
In 3 sizes No 1, 2, and 3, 12s per
doz pairs



Oxford Washing Pad
For cleaning and softening the hands,
and for the Bath. In 1 doz.
boxes. 8s. per doz.

Army Bath Pad
For wet or dry use Hair on both
sides A luxury for the
Bath. 12s. per doz.

For wet or dry
use.

Price,
21s. per doz.

Bath Gloves.

DINNEFORD & CO.,

THE ORIGINAL PATENTEES,

180, New Bond Street, London, W.

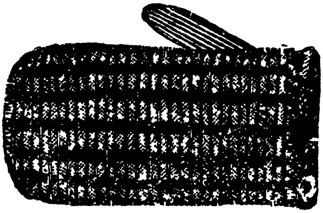
DINNEFORD & CO.

MANUFACTURERS OF

Horse-Hair Friction Gloves, Belts,

Etc., Etc.

WHOLESALE PRICE LIST.



Hound Glove.

Hair on both sides, or in pairs, hair on one side only. Unrivalled for producing a healthy, sleek and glossy surface on the coats of greyhounds, foxhounds, harriers, and other *smooth-coated* dogs.

Double Gloves, 42*s.* per doz.
Single Gloves, or in pairs, No. 1 size, 18*s.*; No. 2, 20*s.*; No. 3, 21*s.* per doz.
or 36*s*, 40*s.*, and 42*s.*, per doz. pairs.

Gent's Flesh Strap and Ladies' Belt.

For dry use only. 42*s.* per doz.

Hair on one side. Ladies' quality, light hair and soft pile. Gent's quality, black or grey, and pile of various degrees of hardness. Specially useful for rubbing the back, spine, and shoulders. An excellent Anti-rheumatic, and very invigorating.

Bath Straps.

For wet or dry use. 42*s.* per doz.

The dry Frictors should be used immediately after rising, and just *before* the shower, sponge, or plunge bath. The most delicate can in this manner enjoy the luxury of a cold bath without the risk of taking cold. A few minutes' friction at bedtime prevents that irritability which so often arises from imperfect action of the skin.

The Bath Gloves and Bath Straps may be used as dry Frictors before the bath, or for wet use generally.

DINNEFORD & CO.,

THE ORIGINAL PATENTEES,

180, New Bond Street, London, W.

CHEMISTS' TRANSFERS.

56, LUDGATE HILL, LONDON.

Messrs. ORRIDGE & CO., Chemists' Transfer Agents,

May be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of Messrs. O. & Co.'s direct attention and advice as to value without any additional fees.

PURCHASERS.—Applicants are invited to forward a statement of their requirements which will be notified **free of charge** in a classified register kept for that purpose.

VALUATIONS.—Valuations having always been a prominent feature, Messrs. ORRIDGE & Co. trust that the **lengthened period** during which they have enjoyed the confidence of the profession will be regarded as a sufficient proof of the sincerity of their endeavours to conduct these transactions in an **honourable** and **straightforward** manner.

Terms for Valuation on Application. Appointments by post or wire have immediate attention.

THOS. GUEST & CO.,

Carruthers Street, MANCHESTER,

MANUFACTURERS OF . . .

MEDICATED LOZENGES, JUJUBES AND PASTILLES.

Antiseptic, Mountain Pine, and Eucalyptus. Menthol and Eucalyptus—Full Strength. Crystallized Cherry Cough Pastilles—Good Selling Line. Linseed, Licorice and Chlorodyne Lozenges in decorated 2 and 4 lb. tins a Speciality. Finest Cachous, Tulips, Opoponax, Parma Violets. Finest Boiled Sugars. Worm Cakes, etc.

SEND FOR LIST, SAMPLES, AND COMPARE.

TELEPHONE 235. TELEGRAMS, "GUESTO."

W. H. CHAPLIN & CO., LTD.,

Wholesale Wine, Spirit & Liqueur Merchants.

HOLDERS OF ONE OF THE LARGEST STOCKS IN LONDON IN BOND AND DUTY PAID.

Market List published Monthly.

Offices: 35 & 36, MARK LANE, E.C., and
10, VILLIERS STREET, W.C., LONDON.

Duty Paid Vaults—Beneath Charing Cross Station, S.E.R.

Telegrams: "WINECHAP, London." **Telephones: 5215 Central, and 3184 Gerrard.**

POWELL & BARSTOW, Limited

Makers of SURGICAL INSTRUMENTS and ELASTIC STOCKINGS.

Ladies' and Gentlemen's Abdominal Belts, etc.
TRUSSES, Anklets, Leggings, Knee Caps, etc., etc.
Bandages, Bath Gloves, Chest Protectors,
Cotton Wool, Druggists' Sundries, Lint,
India Rubber Goods of every Description, etc., etc.

Write for our New Price List.

246a, BOROUGH HIGH STREET, LONDON, S.E.

NATURAL MINERAL - WATERS -

SALTS, PASTILLES, &c.

* * *

SOLE AGENTS FOR

VICHY

STATE SPRINGS

AND

CARLSBAD WATER

AND SALTS.

WHOLESALE AGENTS for

AESCULAP,
BONIFACIUS,
CONDAL,
CONTREXÉVILLE,
EMS,
EVIAN,
FACHINGEN,
FRANZ-JOSEF,
FRIEDRICHSHALL,
GIESSHUBLER,
HUNYADI-JÁNOS,
KRONENQUELLE,
LEVICO,
OBERBRUNNEN,
OBER-SELTERS,
ROSBACH,
ROYAT,
PERRIER,
RUBINAT,
ST. GALMIER,
VALS,
VILLACABRAS,
VITTEL,
WILDUNGEN,

and all other Natural Mineral Waters.

INGRAM & ROYLE, Ltd.

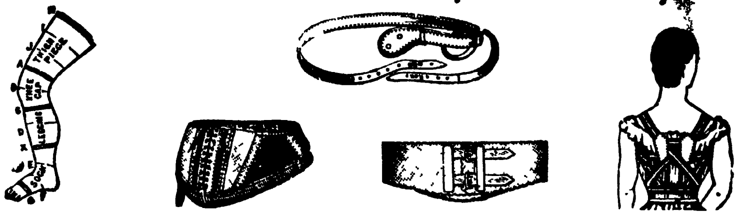
LONDON
(26, Upper Thames St, E C.)

LIVERPOOL
(19, South John St.)

And BRISTOL
(Bath Bridge.)

Price List and Pamphlet on application. Special Discounts For Export.

ELASTIC SURGICAL STOCKINGS, APPLIANCES, etc.



SPECIALITIES - SURGICAL ELASTIC STOCKINGS without Seams. TRUSSES and BELTS for Special Cases. Upon particulars being given, instructions will be forwarded for taking Measures, and Appliances sent. This is a Department worth the attention of Chemists, as a good profit may be obtained upon special articles.

Handbook of my Manufactures will be forwarded to any Surgical Instrument Maker or Chemist free.

SPECIAL TRUSSES FOR SERIOUS CASES.

Elastic Surgical Stockings, Knee Caps, etc.
Patent Spiral Seamless Elastic Stockings, etc.
Patent Pile Surgical Elastic Stockings.
Elastic Supports for Lawn Tennis, Cricket, Lacrosse and other Athletic Sports.
Bath and Rubbing Gloves.
Bathing Caps and Belts.

Trusses of every description.
Poro-Plastic Jackets.
Bandages — Indiarubber, Elastic, Lint, Cotton, Sayres', etc.
Chest Expanding Braces.
Horse Ear Caps & Veterinary Appliances.
Suspensory Bandages.
Ladies' and Gentlemen's Belts.

Hot Water Bottles and Covers, Respirators, Inhalers, Bronchitis Kettles, Throat Sprays, Waterproof Coats, Cloaks and Driving Aprons, Footballs, Shin Guards, and Athletic Appliances, Druggists' Sundries, Invalid and Nursery Appliances, etc.

MANUFACTURER AND PATENTEE -

J. H. HAYWOOD, CASTLE GATE, NOTTINGHAM.

ACIDS, COMMERCIAL AND PURE.

Sulphuric, Puriss Redistilled
Sulphuric, Commercial
Sulphurous, Puriss BP.
Sulphurous Commercial
Nitric Nitros

Aqua Fortis
Dipping
Acetic
Spirits Salts
Liquor Ammonia

W. HOULDER, SON & CO.,

(Established 1780.) Nat. Teleph. 1017 Southall.

SOUTHALL, MIDDLESEX.

TINFOIL IN ANY THICKNESS.

PARCHMENT FOR TYING OVER AND CORKING.

SKINS FOR CAPPING.

H. ERHARDT & CO.,
9, BOND COURT,
WALBROOK, LONDON, E.C.
Telegraphic Address:
"ERHARDT, LONDON."

ALEMBIC AUTOMATIC STILL.

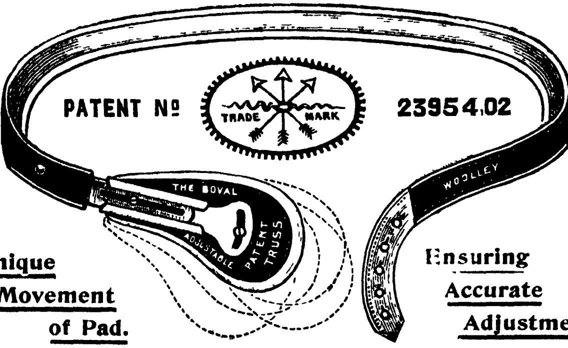
As used in the Pharmaceutical Society, Bloomsbury Square.

We guarantee this to produce 6 pints of aqua dest. per hour. Total cost of gas, ¾d. per gallon. To make Aromatic Waters and the recovery of Alcohol.

38/6 Nett. **Pamphlets on application.**

BROWN & SON, **Engineers, Coppersmiths, Joiners, and Laboratory Specialists.**
MURIEL STREET, AND CHARLOTTE STREET, LONDON, N.

THE "BOVAL" ADJUSTABLE TRUSSES



Unique Movement of Pad.

Ensuring Accurate Adjustment.

OUR TRUSSES are constructed on an **entirely new principle,** the springs and the pads being made separate and distinct, the one from the other. The **springs** are made of the **best steel,** and are slotted to receive our **patented slide,** by means of which **a pad of any desired shape or size** may be attached to a spring. This, in itself, is a great advance over the ordinary Truss with fixed and immovable pad; but, in addition, **the slide is so constructed that the spring may be expanded or contracted as found necessary, whilst the pad may be set at almost any angle,** these adjustments being effected either by the **Fitter** or the **patient and whilst on the body—a unique advantage not found in any other form of Truss.**

Further, whilst the Trusses possess all the advantages claimed above, we have been enabled, by simplifying the method of manufacture, to place them on the market at a price little higher than the old-fashioned Trusses with fixed pads. **Prices on application.**

Prices from 24s. a dozen.

Press, etc., Opinions.

"LANCET" April 3rd, 1903.—"We consider the device is ingenious, and fully answers the purpose. The remarkable price at which it is supplied should lead to its extensive employment."

"THE BRITISH MEDICAL JOURNAL," April 25th, 1903.—"We recommend the invention, as it is likely to prove useful in the majority of cases."

"CHEMIST AND DRUGGIST," February 28th, 1903.—"It is a good invention and its advantages will be appreciated by Truss wearers."

A LONDON SURGEON writes:—"I have worn it two days and find it efficient and comfortable. I consider the movableness of the pads a most useful invention."

A CHEMIST writes:—"Allow me to congratulate you on producing such a comfortable fitting Truss."

JAMES WOOLLEY, SONS & CO., LIMITED,

Patentees and Manufacturers of Trusses and other Surgical Appliances,

VICTORIA BRIDGE, **MANCHESTER.**

JAMES WOOLLEY SONS & CO LTD
JAMES WOOLLEY SONS & CO LTD
Wholesale & Export Druggists

JAMES WOOLLEY, SONS & CO., Ltd.,
MANCHESTER,

Manufacturers and Exporters of **Tinctures, Liniments, Fluid Extracts and all Medicinal Spirits, Flavouring Essences and Perfumes.**

In Bond or otherwise, as desired.

TASTELESS COATED PILLS (Gelatin or Sugar Coating),
SIMPLE AND COMPOUND POWDERS,
LEVIGATED OINTMENTS, COMPRESSED PELLETS,
GELATIN CAPSULES, etc.

Chemical and Physical Apparatus, Optical Instruments and Photographic Requisites.

Druggists' Sundries, Surgical Appliances, Trusses, etc.

WAREHOUSE, OFFICES & SHOWROOMS, VICTORIA BRIDGE.

LABORATORIES AND DRUG MILLS: KNOWSLEY STREET.

Telegrams—"PHARMACY, MANCHESTER."

Prices Current of Drugs and Illustrated Catalogue of Sundries (over 2,000 Illustrations), free on reciept of Business Card.

INDEX TO ADVERTISEMENTS.

Aberdeen School of Pharmacy 542
Allen & Hanburys' Jujubes and Pastilles 555
Atkinson & Barker's Royal Infants' Preservative 560
Atkinson (G.) & Co.'s Specialities in Drugs and Chemicals . . . 557
Attfield's (Dr.) Chemistry (Gurney & Jackson) 542

Boehringer & Soehne's Cocaine and Quinine 556
Bradley & Bourdas's American Cherry Pectoral 558
Brown & Son's Alembic Automatic Still 568
Burroughs Wellcome & Co.'s Soloid Products 541
Bush & Co.'s Essential Oils . . . . . Inside front cover, page 2

Cadbury's Cocoa 556
Chaplin (W. H.) & Co.'s Wines and Spirits 566
Charing Cross Hospital Medical School 544
Churchill's (J. & A.) Publications . . 543 and Inside end cover, page 1

Dinneford & Co.'s Horse-Hair Goods, etc. . . . . . 564 and 565

Erhardt (H.) & Co.'s Tinfoil, Parchment and Skins 568
Evans, Sons, Lescher & Webb, Wholesale Druggists . . 546 and 547

Fink (F.) & Co.'s Specialities in Glycerine, Gums, etc. 566

Guest (T.) & Co.'s Lozenges, etc. 566

Harker, Stagg & Morgan's Assayed Drugs, Spirits, etc. 562
Harrington Bros., Manufacturing Chemists 550
Haywood's (J. H.) Elastic Surgical Appliances 568
Hearon, Squire & Francis, Wholesale Druggists. Inside front cover, page 3
Hirst, Brooke & Hirst's Drugs, Chemicals, etc. 554
Home (G. Y.) & Co.'s Quinine and Orange Wine 558
Hooper, Struve & Co.'s Brighton Seltzer Water. Inside end cover, page 2
Hopkin & Williams' Fine Chemicals 545
Houlder, Son & Co.'s Acids, Commercial and Pure 568
Howards & Sons' Quinine and other Chemicals 545

Idris & Co.'s Royal Mineral Waters . . Inside front cover, page 1
Ince's Latin Grammar of Pharmacy (Baillière & Co.) 542
Ingram & Royle's Natural Mineral Waters, etc. 567

PAGE
Macfarlan (J. F.) & Co.'s Pharmaceutical Preparations 550
Martindale (W.), Wholesale Chemist 552
Martindale & Westcott's Extra Pharmacopœia (H. K. Lewis) . . 542
Mather's (W.) Plaisters, Fly Papers, etc. 563

Orridge & Co.'s Chemists' Transfer Agency 566

Parke, Davis & Co.'s Organic Products 559

Poths (H.) & Co.'s Bottles and Jars 561
Potter & Clarke's Drugs and Herbs . . 554
Powell & Barstow's Instruments and Stockings . 566

Raimes & Co., Wholesale Druggists 562
Ransom (W.) & Son's Specialities 553
Renner's (Dr.) Establishment for Calf Lymph Vaccination . . . 558
Richford's (C. D.) Rubber Stamps 556
Royal Dental Hospital 544

Sanford & Son's Rat Poison 560
Smith (T. H.) & Co.'s Morphine, Codeine, Chloroform, etc. . . 556
Symes & Co.'s Ol. Lavand. Rect., etc. 560

Tyrer (Thomas) & Co's Preparations 551

Whiffen's (T.) Quinine and other Preparations 557
White (Alfred) & Sons' Æthers, Bismuth, etc. 562
Willows, Francis, Butler & Thompson's Animal Extracts . . . 552
Woolley (J.), Sons & Co., Drugs and Surgical Appliances . 569 and 570
Wright, Layman & Umney, Wholesale Druggists . . 548 and 549

TERMS FOR ADVERTISEMENTS.

	£	s.	d.
Whole Page	2	0	0
Half Page	1	2	0
Quarter Page		12	0
Eighth Page		6	6

Position Pages on Special Terms

Communications respecting Advertisements to be addressed to the Publishers,

J. & A. CHURCHILL,
7, *Great Marlborough Street,*
London, W.

Butler & Tanner The Selwood Printing Works, Frome, and London.

J. & A. CHURCHILL.

BOOKS FOR PHARMACISTS.

A TEXT-BOOK OF MATERIA MEDICA. By C. R. Marshall M.D., Professor of Materia Medica, University of St. Andrews, and Examiner in Pharmacology University of London. 127 Illustrations. 10*s.* 6*d.* net.

The Pharmaceutical Journal says: "The Author has been the first among Medical Authors to embody in a work for Students the most recent information concerning chemicals, drugs and galenical preparations, and no fault can be found with his manner of treatment. The book constitutes an excellent introduction to pharmacology and therapeutics, and should also prove useful as a guide to the *British Pharmacopœia.*"

The Chemist and Druggist says: "We think he has produced a book which students of pharmacy will delight in. . . . We confidently commend the book to students of pharmacy as one that will help them in their examination studies, and be useful to them, afterwards."

THE NATIONAL STANDARD DISPENSATORY. Containing the Natural History, Chemistry, Pharmacy, Actions, and Uses of Medicines, including those recognised in the Pharmacopœias of the United States, Great Britain and Germany, and other Foreign Pharmacopœias, in accordance with the eighth decennial revision of the United States Pharmacopœia, 1905. By H. A. HARE, B.Sc., M.D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia; CHARLES CASPARI, Jr., Ph.G., Phar.D. Professor of Theoretical and Applied Pharmacy in the Maryland College of Pharmacy, Baltimore; and HENRY H. RUSBY, M.D., Professor of Botany and Materia Medica in the College of Pharmacy of the City of New York (Columbia University). Members of the Committee of Revision of the United States Pharmacopœia, Eighth Decennial Revision, 1905. 31*s.* 6*d.* net.

By E. W. LUCAS, F.I.C., F.C.S.

Late Examiner of the Pharmaceutical Society of Great Britain.

THE BOOK OF PRESCRIPTIONS, containing a Complete set of Prescriptions illustrating the Employment of the Materia Medica in General Use; comprising also Notes on the Pharmacology and Therapeutics of the principal Drugs and the Doses of their Preparations according to the Imperial and Metric Systems. With an Index of Diseases and Remedies. With an Introduction by Arthur Latham, M.D., F.R.C.P., Physician to St. George's Hospital. 5*s.* net. Prospectus on application.

PRACTICAL PHARMACY. An Account of the Methods of Manufacturing and Dispensing Pharmaceutical Preparations; with a Chapter on the Analysis of Urine. With 283 Illustrations. 12*s.* 6*d.*

By HENRY G. GREENISH, F.I.C., F.L.S.

Professor of Pharmaceutics to the Pharmaceutical Society.

AN INTRODUCTION TO THE STUDY OF MATERIA MEDICA. 213 Illustrations. 15*s.*

THE MICROSCOPICAL EXAMINATION OF FOODS AND DRUGS. 168 Illustrations. 10*s.* 6*d.* net.

SOUTHALL'S ORGANIC MATERIA MEDICA. Edited by John Barclay, B.Sc.Lond. Sixth Edition. 7*s.* 6*d.*

MATERIA MEDICA, PHARMACY PHARMACOLOGY, AND THERAPEUTICS. By W. Hale White, M.D., F.R.C.P., Lecturer on Medicine at Guy's Hospital. Ninth Edition. 6*s.* 6*d.* net.

THE PHARMACEUTICAL FORMULARY: A Synopsis of the British and Foreign Pharmacopœias. By Henry Beasley. Twelfth Edition by J. Oldham Braithwaite. 6*s.* 6*d.*

BEASLEY'S DRUGGIST'S GENERAL RECEIPT-BOOK. Tenth Edition. 6*s.* 6*d.*

TUSON'S VETERINARY PHARMACOPŒIA, including the outlines of Materia Medica and Therapeutics. Sixth Edition. Edited by James Bayne, F.C.S., late Professor of Chemistry and Toxicology, Royal Veterinary College. 7*s.* 6*d.* net.

London: J. & A. CHURCHILL, 7, Great Marlborough Street.